NASA-TM-109858

P-590

National Facilities Study

(NASA-TM-109858) NATIONAL FACILITIES STUDY. VOLUME 4: SPACE OPERATIONS FACILITIES TASK GROUP Final Report (NASA) 590 p

N94-34636

Unclas

G3/09 0015272

Space Operations Facilities Task Group

Volume 4

April 29, 1994

NASA
Washington, D. C.

Volume 4 – Space Operations Facilities Task Group

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National Facilities Study

Space Operations Facilities Task Group

Section I

INTRODUCTION

The principal objectives of the National Facilities Study as outlined in Appendix A were to

a) determine where U.S. facilities do not meet national aerospace needs
b) define new facilities required to make U.S. capabilities "world class" where such improvements are in the national interest,
c) define where consolidation and phase–out of existing facilities is appropriate,
d) develop a long–term national plan for world–class facility acquisition and shared usage.

The Space Operations Facilities Task Group defined discrete tasks to accomplish the above objectives within the scope of the study. An assessment of national space operations facilities was conducted to determine the nation's capability to meet the requirements of space operations during the next 30 years. The mission model used in the study to define facility requirements is described in Volume 3. Based on this model, the major focus of the Task Group was to identify any substantive overlap or underutilization of space operations facilities and to identify any facility shortfalls that would necessitate facility upgrades or new facilities. The focus of this initial study was directed toward facility recommendations related to consolidations, closures, enhancements, and upgrades considered necessary to efficiently and effectively support the baseline requirements model. Activities related to identifying facility needs or recommendations for enhancing U.S. international competitiveness and achieving world–class capability, where appropriate, were deferred to a subsequent study phase.

ORGANIZATION AND SCOPE

The Task Group developed its own Terms of Reference, Appendix B, as a subset of the National Facility Study Terms of Reference, and defined three functional areas to assess the nation's capability to support space operations activities during the next 30 years: manufacturing; mission operations and training; and payload processing, launch, and recovery. These functional areas were also used to determine where facility consolidation, upgrades, and closures could materially reduce budget requirements and improve operational efficiency. Technical working groups were assigned to assess each of the functional areas. The organization of this work and the part-time participants are shown in Appendix C. The working groups analyzed data on over 900 facilities included in the National Facility Study inventory. The breadth of the coverage ranged from government–owned manufacturing and space operations facilities to commercial manufacturing facilities. Although the facility inventory was not completely developed during the initial phase of the study, the major facilities involved in space operations activities have been included.

Each technical working group further defined the scope of their discrete tasks to provide the appropriate analysis boundaries. Facilities which support operational weapon systems have been excluded. What follows is a description of the specific functions and scope of each of the working groups.

Manufacturing

The Manufacturing Working Group included in their assessment the major launch vehicle manufacturing facilities required to support the current and projected commercial and government space operations needs. The group's principal focus was government–owned manufacturing and assembly facilities for propellant tanks, vehicles, liquid engines, and solid rocket motors.

Mission Operations and Training

The Mission Operations and Training Working Group evaluated facilities required to support earth orbiting and deep space support services of all types, including communications and tracking networks, and spacecraft control centers; payload operations and control centers; on–orbit flight support rooms; and other installations of command and control systems supporting on–orbit flights. Also included in this evaluation were facilities used to train flight crews, flight controllers, and ground personnel involved in on–orbit support, and critical ancillary capabilities in direct support of these facilities, including backup power, communications systems, training aircraft, and other systems that are in stand–by to support flight anomaly resolution.

Payload Processing, Launch, and Recovery

The Payload Processing, Launch, and Recovery Working Group assessed facilities required to support orbital, suborbital, and ballistic missions. The range of facilities examined included: launch facilities (transportation, assembly, control, checkout, pads, and structures) and landing sites; launch site payload processing facilities; ordnance processing facilities; and range instrumentation, range control, and range network facilities.

Support Working Groups

Three support working groups were also established to identify and integrate costs, requirements, strategies and policy, and to interface with other study elements. The Cost Analysis Working Group performed detailed cost/benefit analyses in assessing facility options. The Strategy and Policy Working Group identified barriers and issues that could be mitigated by developing strategies and policies that enhance the availability and shared use of facilities to both government and commercial users. The Requirements and Integration Working Group provided the top–level mission requirements for DoD, civil, and commercial space launches based on payload projections; reviewed and integrated the resultant facilities requirements; and interfaced with the Space Research and Development Task Group on underlying mission requirements, overlap between working groups, and opportunities for joint use of facilities.

METHODOLOGY

The Space Operations Facilities Task Group study methodology is depicted in Figure 1. The facilities selected for analysis were chosen based on the database information, the experience and knowledge of team members, and selected site visits by each of the working groups. The mission model (Volume 3) was used as a basis for establishing payload and launch vehicle requirements for the thirty year period (1993 - 2023). For the mission requirements baseline, a launch system architecture was assumed consisting primarily of existing launch vehicles (Space Shuttle, Titan, Atlas, and Delta). An excursion to the baseline mission model was assumed in the Space Operations study to determine the sensitivity of the facility requirements to a radically different vehicle type and its resultant impact on facility needs. A Highly Reusable Vehicle (HRV) single-stage-to-orbit design was selected based on its "leapfrog technology" characteristics and non-traditional launch and recovery concepts.

Each technical working group translated the mission requirements into a set of specific facility requirements. Manufacturing facility requirements were determined to be largely dependent on the flight rate of expendable elements of launch vehicles. Launch, recovery, and payload processing facility requirements were predominantly established by size and annual rate of payloads and the various types of launch vehicles required. Similarly, Mission Operations requirements were established based on the number of payloads in orbit, their orbital parameters (e.g., earth–orbiting, deep space probes), and the complexity of their mission operations.

Once facility requirements were established, each technical working group examined the facility database to identify critical and supporting facilities required to satisfy the mission requirements. For areas where facility capability failed to meet the mission requirement the working groups conducted an assessment of whether the need could be met by modification or upgrade of existing facilities, or whether new facility construction would be required. While this database was an integral part of Task Group activities, some of the working groups found site visits more useful in their analyses. For example in areas of overlap and underutilization additional information was gathered from site visits and other facility studies to formulate recommendations related to joint use, phase–out, consolidation, and closure.

The Space Operations Task Group recommendations were categorized into four groups as follows:

Category 1A: Recommended changes to the status quo or advocated ongoing changes that are consistent with National Facility Study objectives.

Category 1B: Recommended no change (facility required to support mission model).

Category 2: Further study is needed and is merited based on preliminary analysis.

Category 3: No recommendations made at this time due to a lack of data, insufficient time to assess and, in some instances, an initial assessment of no significant cost savings to be realized.

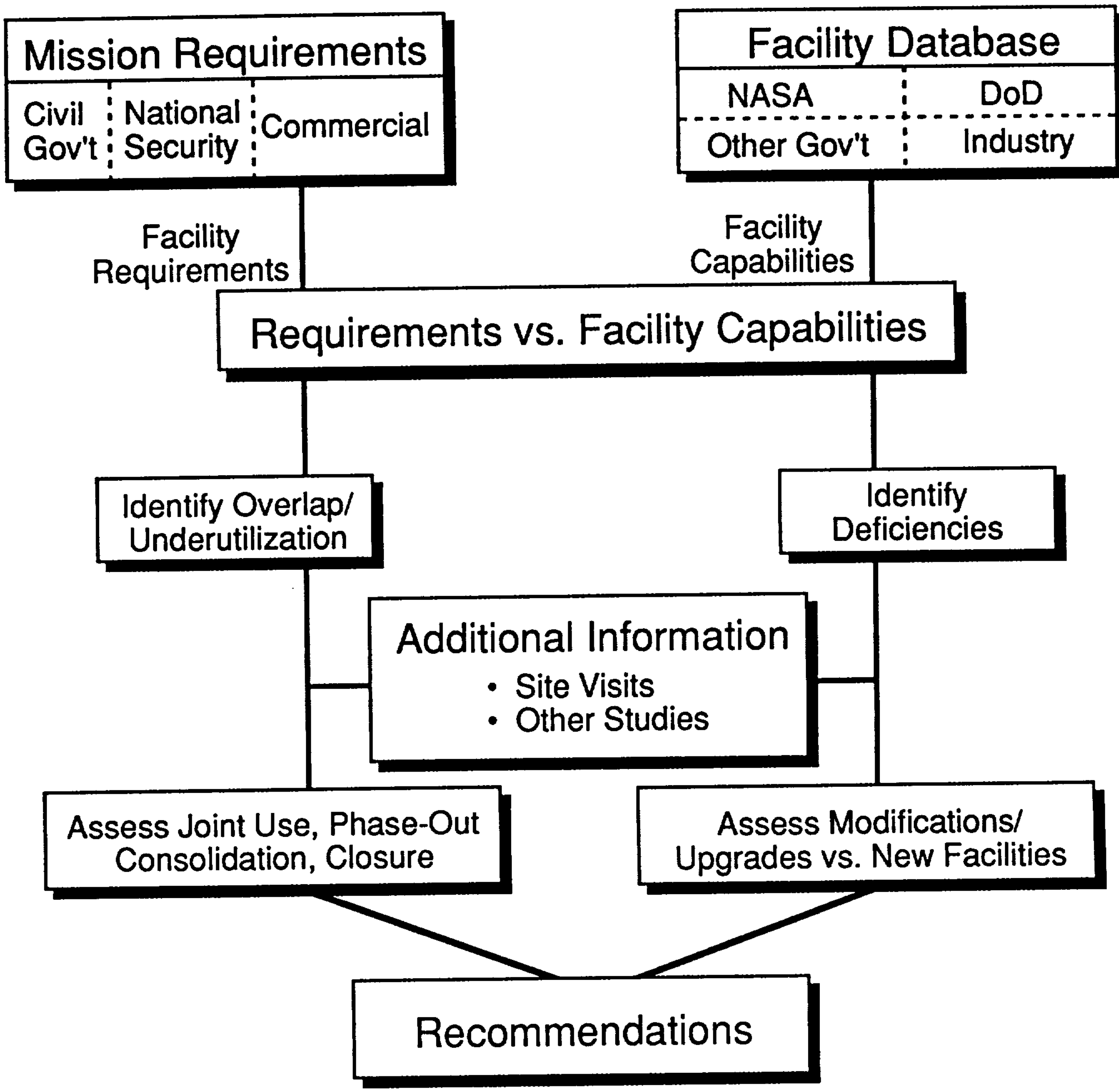

Figure 1. Space Operations Facility Study Methodology.

COST

Cost/benefit analyses were performed on those facilities selected for potential consolidation or closure and all new facilities. The specific analysis established a baseline by documenting the current annual operating costs for the facility. The annual operations and maintenance costs included such items as utilities, facility maintenance, equipment maintenance, communications, janitorial services, and grounds upkeep. The cost of the proposed recommendation was then estimated. Depending on the recommendation, the cost of the option included revised annual operating costs for the building, workforce impacts, equipment relocation costs, and environmental cleanup costs. Anticipated savings or cost avoidances were calculated using the baseline for comparison with the recommended facility option cost.

CONCLUSIONS AND RECOMMENDATIONS

In conducting a study of this scope and magnitude it became evident that a declining space research and operations budget affecting all agencies has resulted in program cancellations and reduced facility demands such that the current facility infrastructure is not being optimally utilized. This trend is expected to continue for some time into the future resulting in excess capacity in manufacturing, mission operations, and launch, recovery and payload processing facilities. In view of this there is a compelling need to institutionalize the national facility study process which establishes and maintains a complete and up-to-date facilities database, a management review and decision process that maximizes utilization of existing facilities within and across agency boundaries and a cradle-to-grave approach to designing, constructing, operating, maintaining, mothballing and closing facilities. It is in this context that the following conclusions and recommendations are presented.

CONCLUSION: There is no consistency between and within agencies at the headquarters level, regarding policies and practices that promote systematic assessment of facility availability, construction, alteration, utilization, consolidation, or closure. Within NASA and DoD, responsibility for facility requirements and disposition occurs at the program office level. As a result, those facilities that provide support to multiple programs (e.g., laboratories, test facilities, equipment) and those that are in a standby status (i.e., non-operational with minimum maintenance) to support future programs, often receive inadequate resources support.

RECOMMENDATION: The National Facility Study should be institutionalized by

(a) assigning a headquarters-level organization in each agency to be responsible for institutional and multi-purpose facility assessments to include availability, utilization, construction, alteration, consolidation, or closure.

(b) establishing a multi-agency coordination process to provide oversight and coordination of interagency facility use and disposition.

CONCLUSION: Prior to this study, a complete, comprehensive up–to–date interagency facilities database did not exist. The National Facilities Study (NFS) Database, assembled by the NFS team, is unique in the range and depth of data content and thus represents a significant achievement. Nonetheless, it must be considered incomplete since voids still exist in the data collection, particularly within the area of industry facilities.

RECOMMENDATION: Effort should be made to collect data missing from the NFS Database and thus maximize its value as a unique reference asset. The Database should be institutionalized in a proper form and maintained by the affected agencies on a permanent basis for future reference by both government and, where appropriate, industry. The Database will prove particularly useful to the organizations responsible for implementing the NFS facility disposition recommendations, as well as to assist future decisions regarding the need for facilities.

CONCLUSION: Inconsistency in facility–use pricing policies presents barriers to cost–effective commercial and interagency shared use of facilities.

RECOMMENDATION: The Aeronautics and Astronautics Coordinating Board augmented with representatives of other agencies should be tasked to conduct a review of the pricing policy and practices of DoD, DoE, DoC, and NASA for the use of their space operations facilities by government agencies and the U.S. private sector. The objective is to develop a uniform policy that removes the existing barriers to the most cost–effective commercial and interagency shared use of U.S. government facilities.

CONCLUSION: Some redundancy of space operations facilities exist. This is sometimes a result of system specific requirements and developments, and in some cases equates to under-utilized manufacturing capacity or ground nodes, and apparent duplication of operations which are not necessarily interoperable. With some modifications to these operational facilities, it is possible to develop and implement standards for operations and interoperability which would allow mutual support across agencies and could ultimately allow for both operational consolidation and increased robustness.

RECOMMENDATION: An interagency task force should be formed to address the redundancy in command and control facilities emphasizing the development of standards for interoperability in order to minimize the number of single purpose facilities and facilitate operational consolidation while maintaining high mission success rates.

CONCLUSION: The Task Group found evidence of facility deterioration and obsolescence which significantly constrains efficient and effective facility performance. This conclusion has been previously noted by various studies within NASA and DoD. In general, NASA and DoD spends approximately 2% of current replacement value for facility maintenance compared to a recommended 3-4%.

RECOMMENDATION: Consolidate and close facilities where practical and increase facility maintenance budgets to the extent necessary to reverse the current trend of deterioration and obsolescence of remaining facilities.

CONCLUSION: Studies conducted to date for Highly Reusable Vehicles (e.g., SSTO) indicate that a significant number of existing or modified facilities can be utilized to support manufacturing, assembly, checkout, launch, and mission operations. A complete definition of facility requirements for any major new launch system, however, are dependent on the specific vehicle configuration being considered and program architecture relative to operational cost considerations (e.g., co-location of manufacturing, test and launch facilities).

RECOMMENDATION: A facility needs and requirements assessment for a Highly Reusable Vehicle or any other new launch system should be held in abeyance pending definition of the vehicle configuration and program architecture.

Recommendations for all Category 1 and 2 facilities and a complete listing of Category 3 facilities are included in Section II of this volume.

OBSERVATIONS

In addition to the above conclusions and recommendations, several significant observations emerged during the evaluation and are enumerated below.

Agency–to–Agency Cooperation

At operational locations where multiple agencies coexist, the Task Group found noteworthy examples of agency–to–agency cooperation that can serve as a model for the future. Examples include the following:

- An Air Force/NASA liaison team operates at Cape Canaveral Air Force Station (CCAFS) and Kennedy Space Center (KSC) to coordinate range and launch scheduling, facility usage and sharing, and other activities. (A recent review of bridge cranes for launch processing used joint NASA/Air Force expertise for resolution. Also, a KSC Vehicle Assembly Building safety issue was identified and resolved using Air Force safety directives.) Many functions, such as medical support and propellant services, are administered by one agency, but include support to the other agency as appropriate.

- NASA representatives attend Air Force range scheduling and operations review meetings, and the KSC Center Director and the Air Force's 45th Space Wing Commander conduct a joint quarterly management meeting.

These examples show that interagency cooperation and sharing are viable. NASA and DoD should formally adopt this approach within our agencies as the preferred way of doing business.

Other Initiatives

We found individuals at the operational level, taking a corporate, long–term view, defining the vision/mission for their organizations, and achieving important results. They squeeze dollars out of shrinking budgets to preserve one–of–a–kind, world–class capabilities. An excellent example is the Wallops Flight Facility (WFF). Wallops has a customer–oriented, low–cost approach to the launch of research sounding rockets. Their approach emphasizes off–the–shelf components, realistic risk acceptance, and rapid response time (typically 90 days) to customer requirements.

In general, programs have achieved high mission success rates in spite of the impediments of reduced budgets, facility underutilization and lack of facility modernization upgrades. Many facilities are maintained in good condition reflecting the dedication and perseverance of the people. The DoD has initiated several facility consolidation/closure and/or upgrade actions in response to reduced budgets and a need to assure a viable long–term facility infrastructure. NASA is initiating similar activities as a result of budget reductions and related facilities studies.

Other Observations

In addition to the positive observations described above, other observations from this initial study include the following:

> It was observed that during this period of dramatic downsizing of all participating departments and agencies, the roles and missions of the agencies as currently established has, in some cases, produced an overlap of functions and responsibilities. This was a limiting factor in defining some facility improvements or savings/de-commissioning. Nonetheless, the review concentrated on best technical approaches and opportunities which might guide future strategic planning. The agency heads may want to review overlapping functions and responsibilities to determine if and where greater efficiencies/cost reduction could result without impacting negatively on the agency milestones.
>
> The baseline mission model projection for the next 30 years requires a limited number of new facilities (e.g., the Neutral Buoyancy Laboratory for Space Station). However, there is a continuing requirement for substantial investment in upgrading and enhancing the facility infrastructure to maintain operational viability and achieve substantial economies in outyears (e.g., Air Force Range Standardization and Automation Program).
>
> Substantial cost savings can best be realized when consolidation of activities results in reduced workforce requirements through increased efficiency and elimination of duplicative effort. Closure or consolidation without workforce reductions will only result in modest savings.

Working Group Observations

Several observations emerged from the three technical working groups.

Manufacturing

- Almost all manufacturing facilities are significantly underutilized and can support the mission model without expansion. Consolidation of Contractor–Owned–Contractor–Operated (COCO) facilities will be driven by market forces and government actions.

- Investment will be required to incorporate state–of–the–art manufacturing technology and for routine maintenance and refurbishment (M&R).

• Major costs in Government–Owned–Contractor–Operated (GOCO) facilities are not driven by operations and maintenance (O&M) costs, but rather by workforce. The elimination of duplicative workforces will result in major savings and allow facility consolidations which will reduce O&M costs.

• Although outside the scope of the facilities study, there is a joint government and aerospace concern that potential loss of lower–tier suppliers in the industrial base will impact support to future business.

Mission Operations and Training

• Proliferation of flight and crew training capabilities exist at various locations.

• There is a scattering of mission payload training and control capabilities.

• People and skills are as important as facilities. Several areas exist where critical skills are possessed by an aging workforce and few provisions have been made for skill transfer.

• Declining mission orbital support requirements, based on the projected mission model, will only increase the system capacity excess.

Payload Processing, Launch, and Recovery

• Many facilities are underutilized and can easily support the mission model for the next 30 years.

• Major initiatives now in process will significantly improve the way we do business and achieve substantial economies in out years.

• Joint and shared use of facilities to support the commercial market is possible and desirable.

SCHEDULE

The following two figures show examples of major recommendations identified by the working groups. Figure 2 includes Category 1A recommendations and the proposed implementation schedule. Figure 3 addresses Category 2 recommendations, which include continuing or initiating further studies. The recommendation charts found in Section II identify agencies/offices responsible for performing the Category 2 studies.

RECOMMENDATION	FEB 94	MAR 94	APR 94	MAY 94	LATE FY94	FY95	FY96	FY97	FY98	POST FY98
Consolidation of Dedicated DMSP Facilities							Δ Phase I			Δ Phase 2
Move AF Space Operations Training to Falcon AFB		Δ Phase I			Δ Phase 2					
Construct Neutral Buoyancy Facility, Close WETF, NBS						Δ		Δ		
Cancel Construction of SSME Shop, Expand in Existing Facility	Δ Cancel Construction				Δ Expand in Existing Facility		Δ			
Transfer Ft. Irwin Antennas from Army to NASA			Δ MOA			Δ Implementation				
Yellow Creek Explore Alternate uses of Fac.	Δ		Δ RSRM Nozzle Facility			Δ 1Q				
Support Divestiture of AF Plant Facilities				Δ AF Plant 19		Δ AF Plant 70 Δ AF Plant 78		Δ AF Plant PJKS		
Close Slidell Computer Complex		Δ				Δ				
Cancel Proposed New EOS Processing Facilities		Δ Cancel Construction								
Range Standarization and Automation			Eastern Range ROCC IOC		Δ	GPS Tracking IOC	Antigua CIF IOC	Δ	Ascension CIF IOC Δ	Additional Upgrades thru 2003
Support Commercial Space Ventures	Assign SLC-6 Admin Facilities for Comm. Use Assign SLC-6 Payload Preparation Rooms for Commercial Use	Transfer VAFB Scout Facilities		Δ	Δ Δ Δ Assign SLC-6 Launch Pad Area for Comm. Use Δ Commercial Spaceports Δ Modify CX46 for Small Comm. Boosters	Comm. Use of ABRES A & B, 576			Δ	
Mothball/Abandon Launch Pads					Δ Mothball Pad 3A Scout Launcher (WFF) Δ Pad 4 (WFF)					
Upgrade Poker Flat Research Range					Δ Construct Rocket Assembly Building "C" Δ Upgrade Launch Area 3 Δ Construct Telemetry Facility	Δ Construct New Science Operations Center				
Surplus/Find Use for Hypergolic Storage Facility at CCAFS			Δ Identify Potential Use(s)		Δ Match Potential Use(s) with Requirements or Surplus					
Consolidate Spacelab Data Processing Facility	Δ Study		Δ GSFC/MSFC MOA			Δ Implementation				

Figure 2. Space Operations Schedule (Category 1A)

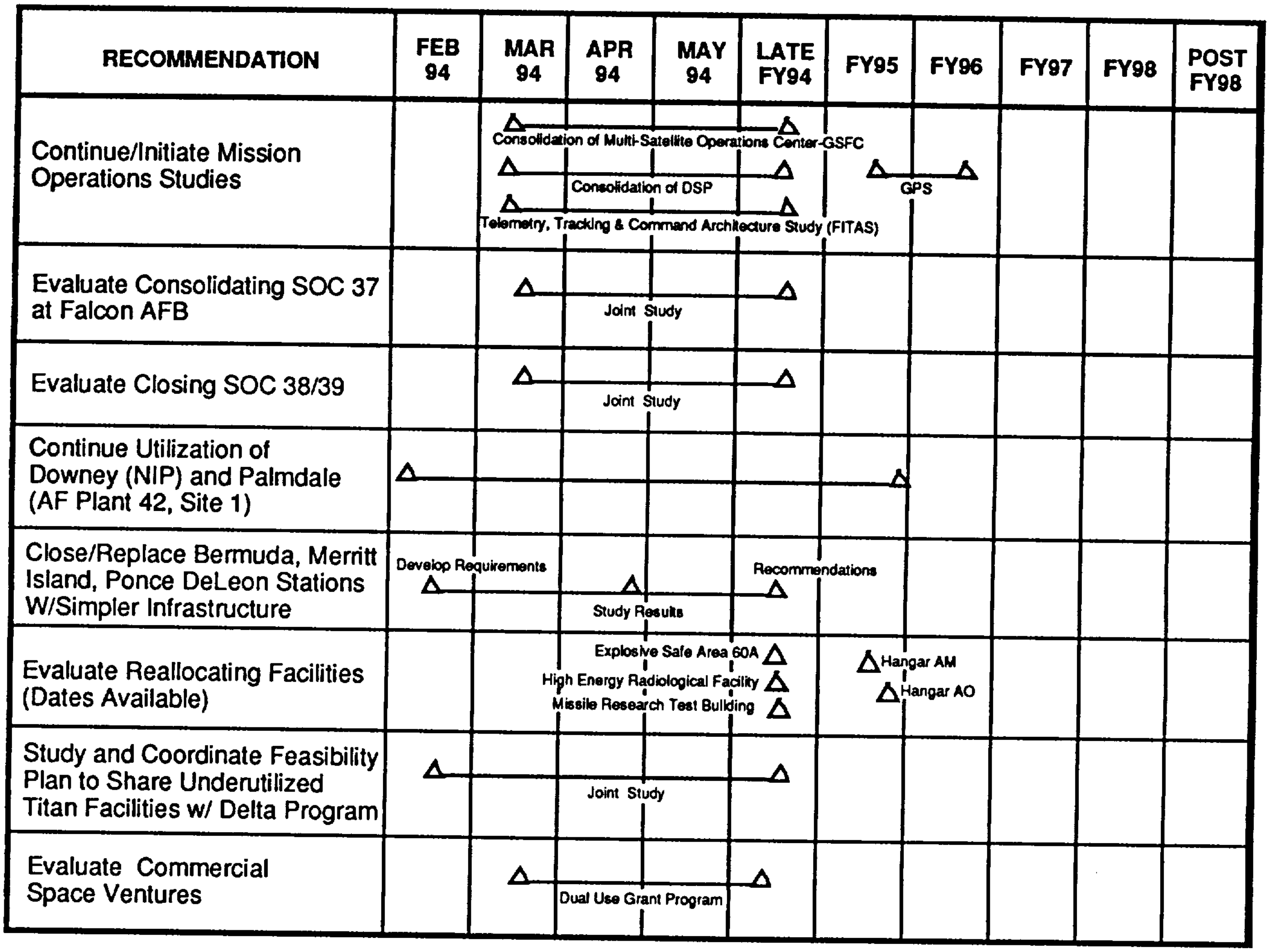

Figure 3. Space Operations Schedule (Category 2)

IMPLEMENTATION COSTS

Table 1 is a spreadsheet which summarizes the costs of all Categories 1A and 2 recommendations.

SPACE OPERATIONS FACILITY TASK GROUP
SUMMARY OF RECOMMENDATIONS

Rec #	Working Group	Agency	Facility Description	Facility Location (State)	Recommendation	Cat	Implem. Cost	Comment	One-Time Savings or Cost Avoidance	Cost Avoidance /Savings per year *	Cost Avoidance /Savings per year Adjustment
CATEGORY 1A TOTALS						1A	$78.7M		$48.8M	$28.960M	$30.820M
1	PPLR	NASA/ Air Force	VAFB Scout Facilities	CA	Transfer Facilities to Air Force after launch of last Scout in FY1994	1A	$0.0M		N/A	$1.900M	
2	PPLR	NASA	L-188 Electra & SC-7 Skyvan	VA	Excess two aircraft and complete C-130Q reconfiguration	1A	$0.2M	Already Planned	$1.5M	$0.120M	
3	PPLR	NASA	Launch Equipment Test Facility	FL	Downgrade maintenance activities	1A	$0.0M		N/A	$0.200M	
4	PPLR	Air Force	Building 7422	CA	Build new fuels lab for environmental compliance & demolish building 7422	1A	$4.0M		N/A	$0.722M	
5	PPLR	Air Force	Advanced Ballistic Reentry System & 576E Launch Pad	CA	Realign to commercial space	1A	$0.0M	Already Planned	N/A	$0.181M	$4.00M
6	PPLR	NASA/DOT/ DOD	Above Ground Explosive Magazine	VA	Continue with mod. to a Pegasus ordnance and assembly builidng for commercial use	1A	N/A	Already Planned	N/A	$0.025M	
7	PPLR	NASA/DOT	PAD 3A Scout Launcher Complex	VA	Mothball Pad 3A Scout Launcher Complex & make available to commercial users	1A	$0.0M		N/A	$0.020M	
8	PPLR	DOD/DOT	Space Launch Complex 6, Administrative Facilities	CA	Assign administrative support buildings to commercial users	1A	$0.0M	Already Planned	N/A	$0.033M	$0.20M
9	PPLR	DOD/DOT	Space Launch Complex 6	CA	Assign to suitable commercial users	1A	$0.0M	Already Planned	N/A	$0.062M	$13.80M
10	PPLR	NASA	Launch pad 39 A/B standdown	FL	Do not place a launch pad in standdown mode with ability to reactivate within 6 months	1A	$0.0M		N/A	$0.000M	
11	PPLR	NASA	SSME Shop	FL	Modify existing facility	1A	$4.5M		$9.3M	$0.000M	$0.40M
12	PPLR	NASA	Pad 4 / W-30 (WFF)	VA	Abandon pad	1A	$0.0M	Already Planned	N/A	$0.005M	$0.02M
13	PPLR	DOD/DOT/ NASA	Commercial Spaceports	CA, NM, AK	Continue Implementing Air Force Dual Use Program	1A	TBD	Already Planned	N/A	TBD	
14	PPLR	DOD/DOT	Complex 46	FL	Modify complex for commercial use	1A	$2.1M	Already Planned	N/A	$0.000M	
15	PPLR	Air Force	Construct Delta Launch Operations Facility	FL	Relocate functions from SLC-17 Blockhouse	1A	$2.9M	Already Budgeted	N/A	$0.056M	$6.00M
16	PPLR	NASA/DOD	Payload Assembly & Checkout Bldg, Naval Surface Warfare Center Land Based Combat Systems Lab & Performance Test Facility	VA	Transfer to DOD and Commercial users for safety reasons	1A	$0.0M	Already Planned	N/A	$0.000M	

TAB

SPACE OPERATIONS FACILITY TASK GROUP
SUMMARY OF RECOMMENDATIONS

Rec #	Working Group	Agency	Facility Description	Facility Location (State)	Recommendation	Cat	Implem. Cost	Comment	One-Time Savings or Cost Avoidance	Cost Avoidance /Savings per year *	Cost Avoidance /Savings per year Adjustment
17	PPLR	NASA/DOT	Payload Processing Facility	VA	Modify to support small ELV launches	1A	$0.7M		N/A	$0.000M	
18	PPLR	NASA	Rocket Assembly Building	AK	Complete construction of new facility	1A	$0.9M	Already Budgeted	N/A	$0.000M	
19	PPLR	NASA	Optical Observatory	AK	Abandon Optical Observatory, Complete construction of new Science Operations Center	1A	$3.3M	Already Budgeted	N/A	$0.000M	
20	PPLR	NASA	Upgrade Launch Area 3	AK	Complete construction of new facility	1A	$1.0M	Already Budgeted	N/A	$0.000M	
21	PPLR	NASA	Telemtry Facility	AK	Complete construction of new facility	1A	$1.2M	Already Budgeted	N/A	$0.000M	
22	PPLR	NASA	Vehicle Assmebly Building at White Sands	NM	Proceed with contract award to comply with safety standards	1A	$0.3M	Already Budgeted	N/A	$0.000M	
23	PPLR	NASA	ASRM Kneel Down Transporter	FL	Transfer transporters to MSFC for use on Space Station Program	1A	$0.0M		N/A	$0.000M	
24	PPLR	NASA	New EOS Facility at VAFB	CA	Use existing Air Force facility for EOS processing	1A	$0.0M		$15.0M	$0.000M	
25	PPLR	NASA/DOD	White Sands Space Harbor (WSSH)	NM	Eliminate WSSH as an Orbiter landing site	1A	$0.0M		N/A	$1.500M	
26	PPLR	NASA	KSC Helicopter fleet	FL	Excess KSC fleet of 4 UH-1 helicopters & have DOD provide remaining support	1A	$0.0M		N/A	$0.290M	
27	PPLR	Air Force	Hypergolic Storage Facility	FL	Excess facility	1A	$0.0M	Already Under Study	N/A	$0.003M	
28	PPLR	DOD/DOT	Space Launch Complex 6, Payload Preparation Room	CA	Develop a schedule for Commerical & DOD use	1A	$0.0M	Already Planned	N/A	$0.343M	$4.00M
29	PPLR	NASA	Orbiter Protective Enclosure	FL	Excess facility	1A	$0.0M		$0.3M	$0.000M	
30	MFG	NASA	Slidell Computer Complex	LA	Close SCC and transfer work to MSFC	1A	$2.1M		N/A	$9.000M	
31	MFG	Air Force	Air Force Plant 19	CA	Transfer property to Navy	1A	$0.0M	Already Under Study	N/A	$0.000M	
32	MFG	Air Force	Air Force Plant 70	CA	Sell property to Aerojet	1A	$0.0M		$2.2M	$0.000M	

TABLE 1.

SPACE OPERATIONS FACILITY TASK GROUP
SUMMARY OF RECOMMENDATIONS

Rec #	Working Group	Agency	Facility Description	Facility Location (State)	Recommendation	Cat	Implem. Cost	Comment	One-Time Savings or Cost Avoidance	Cost Avoidance /Savings per year *	Cost Avoidance /Savings per year Adjustment
33	MFG	Air Force	Air Force Plant 78	UT	Lease or transfer agreement	1A	$0.0M		N/A	$0.000M	
34	MFG	Air Force	Air Force Plant PKJS	CO	Sell/transfer to Martin Marietta	1A	TBD		N/A	TBD	
35	MFG	NASA	Yellow Creek Facility	MS	Terminate Yellow Creek Facility as planned	1A	N/A	Already Budgeted	N/A	N/A	
36	MOT	Air Force/ NOAA	Defense Meteorological Satellite Program Facilities	WA & NB	Close DMSP facilities at Fairchild & Offutt	1A	$8.5M	Already Funded	N/A	$2.500M	
37	MOT	NASA	Neutral Buoyancy Similiator & Weightless Environment Training Facility	TX & AL	Build NBL to support Space Station training, close WETF and discontinue training at WETF and the NBS	1A	$32.5M		$4.5M	$5.000M	$2.40M
38	MOT	Air Force	Space Operations Training (SOT)	CO	Move SOT to Falcon AFB	1A	$0.0M	Already Budgeted	N/A	$2.000M	
39	MOT	NASA/Army	34-meter antennas (2)	CA	Transfer from Army to NASA	1A	$12.0M		$16.0M	$0.000M	
40	MOT	NASA	Spacelab Data Processing Center	MD	Relocate to MSFC	1A	$2.5M			$5.000M	

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SPACE OPERATIONS FACILITY TASK GROUP
SUMMARY OF RECOMMENDATIONS

Rec #	Working Group	Agency	Facility Description	Facility Location (State)	Recommendation	Cat	Implem. Cost	Comment	One-Time Savings or Cost Avoidance	Cost Avoidance /Savings per year *	Cost Avoidance /Savings per year Adjustment
CATEGORY 2 TOTALS						**2**	**$12.7M**		**$0.0M**	**$102.033M**	
1	PPLR	Air Force /NASA	Bermuda, Merrit Island & Ponce De Leon tracking stations		Replace existing systems	2	TBD			$23.000M	
2	PPLR	NASA/ Air Force	NASA Shuttle Logistics Depot	FL	Relocate to existing government facility on KSC or CCAFS	2	TBD			$3.900M	
3	PPLR	NASA	Operations & Checkout Building	FL	Determine future utilization	2	TBD			TBD	
4	PPLR	NASA	KSC Railroad	FL	Transfer operations to private contractor	2	TBD			$0.757M	
5	PPLR	Air Force	VAFB Railroad	CA	Transfer operations to private contractor	2	TBD			$0.176M	
6	PPLR	Air Force/ NASA/DOT	ESA 60A Facilities	FL	Joint NASA/Air Force study for alternate uses	2	TBD			TBD	
7	PPLR	Air Force/ NASA	High-Energy X-ray Facility (HERF)	FL	Evaluating Titan X-ray facility for use by all, If so, modify HERF to a motor buildup facility	2	TBD			TBD	
9	PPLR	Air Force/ NASA	Hanger AO & AM at Cape Canaveral	FL	Joint NASA/Air Force study for alternate uses	2	TBD			TBD	
10	PPLR	NASA	Payload Spin Test Fac. Replacement	FL	Determine utilization	2	TBD			TBD	
11	PPLR	Air Force	Launch Operations Control Center	FL	Shared use	2	TBD	Already Under Study		TBD	
12	PPLR	Air Force	Atlas Hanger K at CCAFS	FL	Increase utilization	2	TBD	Already Under Study		TBD	
13	PPLR	Air Force	Titan Facilities at Cape Canaveral	FL	Use excess Titan facilities for Delta infrastructure	2	TBD	Already Under Study		TBD	
14	PPLR	Air Force/ Navy/NASA	Cape Canaveral Skid Strip	FL	Close CCAFS Skid Strip and Use Shuttle Landing Facility	2	TBD			TBD	
15	PPLR	Air Force/ Navy	Ascension Weather Station		Relocate/Consolidate	2	TBD			TBD	
16	PPLR	DOD	Launch Complex-4W Titan II Facilities	CA	Develop multi-purpose launch complex	2	TBD			TBD	
17	PPLR	DOD	Titan X-Ray Facility	CA	Consolidate use with other programs	2	TBD			TBD	

TABLE 1.

SPACE OPERATIONS FACILITY TASK GROUP
SUMMARY OF RECOMMENDATIONS

Rec #	Working Group	Agency	Facility Description	Facility Location (State)	Recommendation	Cat	Implem. Cost	Comment	One-Time Savings or Cost Avoidance	Cost Avoidance /Savings per year *	Cost Avoidance /Savings per year Adjustment
18	PPLR	DOD	Payload Test Facility	CA	Consolidate use	2	TBD			TBD	
19	PPLR	DOD	Machine Shops at East & West Coast Launch Ranges	CA & FL	Possibility of consolidating machine shops	2	TBD			TBD	
20	PPLR	DOD	Payload Fairings Buildings	CA	Consolidate use of this facility	2	TBD			TBD	
21	PPLR	DOD	Hazardous Waste Storage, Ordance Storage, Booster Support Equipment Storage	CA	Consolidate into another buidling and covert exsiting building to storage	2	TBD			TBD	
22	PPLR	Air Force	SLC 36A	FL	Modify for commercial Atlas launches	2	TBD			TBD	
23	PPLR	Air Force/ NASA	Facilities for Single-Stage-to-Orbit Program		Determine what existing infrastructure will support the program	2	TBD			TBD	
24	MFG	NASA	NASA Industrial Plant	CA	Move portion or all of NASA work to KSC & JSC	2	TBD			TBD	
25	MFG	NASA/ Air Force	Air Force Plant 42 Site 1	CA	Consider closing AF plant 42 site 1 after current vehicle inspection	2	$2.0M	Already Budgeted	N/A	$38.500M	
26	MOT	DOD/NASA/ NOAA	Optimize Network & Operational Consolidation		Optimize satellite command & control systems	2	TBD			TBD	
27	MOT	NASA	Multi-Satellite Operations Center at GSFC	MD	Terminate support and transfer operations	2	$3.5M			$4.000M	
28	MOT	NASA	JPL's Space Flight Operations Facility (SFOF)	CA	Transfer mission ops for TOPEX & Magellan to Advanced Mission Ops System	2	TBD			$20.000M	
29	MOT	Air Force	RDT&E Operations Center (SOC 37)	CA	Study Consolidation to FAFB	2	TBD			TBD	
30	MOT	Air Force/ NASA	Satellite Operations Centers (SOC 38 & 39)	CA	Study closure	2	TBD			TBD	
31	MOT	Air Force	GPS Operations	CO	Study consolidation	2	TBD			TBD	
32	MOT	Air Force	DSP Operations		Study consolidation	2	TBD			TBD	
33	MOT	NASA	Spacelab Crew Training Functions	AL	Consolidate the 3 facilities (1 at MSFC and 2 at JSC) to JSC	2	$2.0M			$1.700M	
34	MOT	NASA	Crew Training Facilities	TX	Consolidate all Crew Training facilities to JSC	2	TBD			TBD	
35	MOT	NASA	Wallops 60 ft. Antenna & IUE Facility	VA	Study closure	2	TBD			TBD	

SPACE OPERATIONS FACILITY TASK GROUP
SUMMARY OF RECOMMENDATIONS

Rec #	Working Group	Agency	Facility Description	Facility Location (State)	Recommendation	Cat	Implem. Cost	Comment	One-Time Savings or Cost Avoidance	Cost Avoidance /Savings per year *	Cost Avoidance /Savings per year Adjustment
36	MOT	NASA/ Air Force	Replace some Laser Tracking Stations w/ GPS		Reduce number of laser tracking stations	2	$5.2M			$10.000M	

* Adjusted column reflects a delta increase to the annual Operations & Maintenance cost avoidance/savings based on 4% of the current replacement value of the fac

PPLR - Payload Processing, Launch, & Recovery Working Group
MOT - Mission Operations and Training Working Group
MFG - Manufacturing Working Group

1A - Full & Complete Recommendation Should be Implemented
2 - Recommendation Requires Further Study

TABLE 1.

NATIONAL FACILITIES STUDY

VOLUME 4

SPACE OPERATIONS FACILITIES TASK GROUP

SECTION II

SPACE OPERATIONS FACILITIES TASK GROUP
CATEGORIES OF RECOMMENDATIONS

- CATEGORY 1A: Recommended changes to the status quo or advocating ongoing changes that are consistent with National Facilities Study objectives
- CATEGORY 1B: Recommending no change (facilities required to support mission model)
- CATEGORY 2: Further study is needed and is merited based on preliminary analysis.
- CATEGORY 3: No recommendations made at this time due to lack of data, insufficient time to assess and in some instances an initial assessment of no significant cost savings to be realized.

SPACE OPERATIONS FACILITIES TASK GROUP
FACILITY FINDINGS

FACILITIES BY CATEGORY	NO.	PERCENTAGE
FACILITIES WITH RECOMMENDED CHANGE (CAT 1A)	162	17%
FACILITIES WITH NO RECOMMENDED CHANGE (CAT 1B)	411	45%
FACILITIES STILL UNDER ANALYSIS (CAT 2)	120	14%
FACILITIES NOT EVALUATED (CAT 3)	219	24%
TOTAL FACILITIES	912	100%

SPACE OPERATIONS FACILITIES TASK GROUP FACILITY FINDINGS

FACILITIES BY CATEGORY	MANU-FACTURING	MISSION OPS & TRAINING	PAYLOAD PROC., LAUNCH & RECOVERY
FACILITIES WITH RECOMMENDED CHANGE (CAT 1A)	6	12	144
FACILITIES WITH NO RECOMMENDED CHANGE (CAT 1B)	8	70	333
FACILITIES STILL UNDER ANALYSIS (CAT 2)	2	21	97
FACILITIES NOT EVALUATED (CAT 3)	2	89	128
TOTAL FACILITIES	18	192	702

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY

WORKING GROUP

FACILITY FINDINGS

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

TABLE OF CONTENTS

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

INTRODUCTION

The Payload Processing, Launch, and Recovery (PPLR) Working Group of the Space Operations Facilities Task Group was chartered to formulate a coordinated national plan for world class PPLR facilities in support of space operations to satisfy current and projected needs for both commercial and Government requirements. More specifically, the team's purpose was to define where consolidation and/or closure of existing facilities is appropriate, determine where United States PPLR facilities do not meet national space operations needs, and identify world class facilities.

The working group took a three-phase approach to attain its objectives. The first phase (Data Acquisition) identified and collated all data which supported the National Mission Model. The Mission Model was used as the study baseline. The Mission Model lists vehicle and payload types, including but not limited to: Titan, Atlas, and Delta expendable launch vehicles; Transfer Orbiter Stage (TOS), Inertial Upper Stage (IUS), and Centaur upper stages; and the Space Shuttle reusable launch vehicle. The vehicles named in the Mission Model and the launch facilities needed for their support of the nation's space launch program were the focus of the working group. The working group also considered payload processing and recovery requirements. Sources of data included Government facility master plan handbooks from different sites, data packs obtained from contractors, assorted existing studies, and site visits to launch facilities, including White Sands Missile Range, NM; Kennedy Space Center, FL; Cape Canaveral AFS, FL; Vandenberg AFB, CA; Wallops Flight Facility, VA; and Poker Flat Research Range, AK. This data was collected and analyzed using the following assumptions:

1. Only Government-owned direct launch support and payload processing facilities were included.
    a. Contractor facilities were not considered.
    b. Operational ballistic missile weapons systems were not included as launch vehicles.
2. Scope of the project:
    a. Launch site payload processing facilities
    b. Launch complexes/facilities
    c. Range and range-support capabilities
    d. Recovery and landing sites
    e. Direct launch support
    f. Commercial space initiatives

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

INTRODUCTION (Cont)

In phase two (Data Compilation), the working group developed a facility database to identify and describe facilities within the project scope. Over 700 different facilities were included and over 2000 hours were expended in compiling necessary data about each facility (e.g., door sizes, crane capacities, processing bay sizes, etc.). Data was then entered into the new computerized database.

In phase three (Data Assessment), each facility in the database was analyzed against the requirements of the Mission Model and was processed in accordance with the flow-down requirements as shown in the logic chart (see figure).

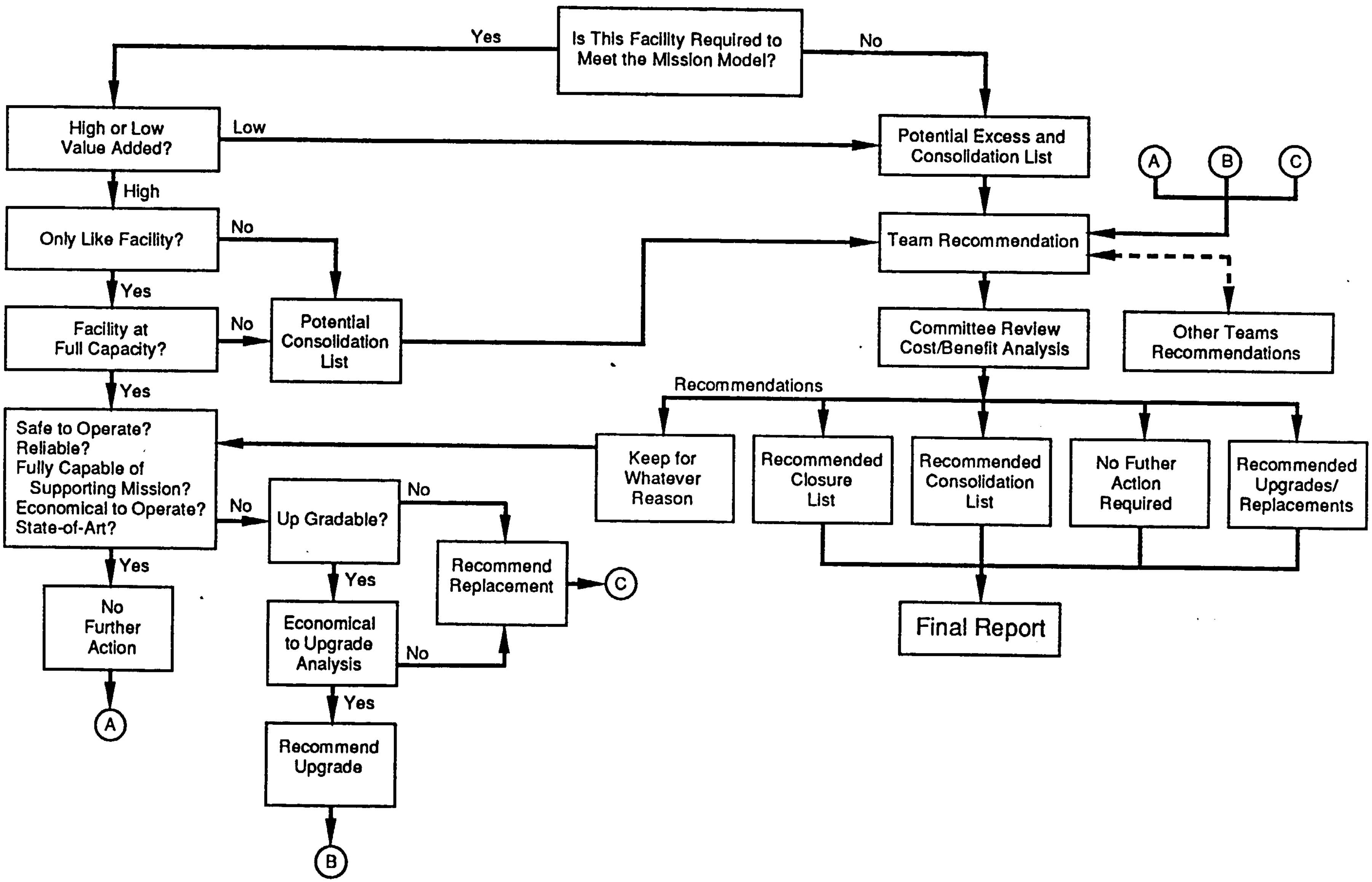
Following the decision tree flow-down, the working group analyzed each facility and made recommendations in accordance with one of four categories: 1A, 1B, 2, and 3. These categories were developed and compiled into a format for the final report for the Payload Processing, Launch, and Recovery Working Group.

Summary of Facility Inventory and Findings

Facilities with recommended change (CAT 1A)	144
Facilities with no recommended change (CAT 1B)	333
Facilities still under analysis (CAT 2)	97
Facilities not evaluated (CAT 3)	128
Total facility inventory	702

The following pages represent the group findings and recommendations.

National Facility Study
Decision Tree



M2/MDP/usr/customer/Don Page/Nat Fac Stdy Decision Tree

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

CATEGORY 1A's

The following list of facilities represents those facilities where the team recommends a change to the status quo or advocates continuance of ongoing changes that are consistant with National Facility Study objectives.

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
1	Range Standardization and Automation (RSA)	1A
2	Transfer the VAFB Scout Facilities to the Air Force/Commercial User	1A
3	Excess SC-7 Skyvan and L-188 Electra Aircraft, Reconfigure NASA 427, C-130Q Aircraft	1A
4	Downgrade of the Launch Equipment Test Facility (LETF)	1A
5	Build New Fuels Laboratory and Demolish Old Buildings	1A
6	Commercial Use of Advanced Ballistic Reentry System (ABRES) A&B and 576E	1A
7	Modify Above Ground Explosive Storage Magazine/M-20	1A
8	Mothball Pad 3A Scout Launcher Complex/W-96	1A
9	Assign Space Launch Complex 6 Administrative Facilities for Commercial Use	1A
10	Assign Space Launch Complex 6 Launch Pad Area for Commercial Use	1A
11	Assign Space Launch Complex 6 Payload Preparation Rooms for Commercial Use	1A
12	Do Not Standdown One Shuttle Launch Pad	1A
13	Do Not Construct Space Shuttle Main Engine Shop (NASA) (KSC)	1A
14	Abandon Pad 4/W-30	1A
15	Commercial Space Activities	1A
16	Continue Activation of the Range Operations Control Center (ROCC)	1A
17	Modify Complex (CX) 46 for Small Commercial Boosters	1A
18	Construct Centaur Processing Facility (CPF)	1A
19	Construct Delta Launch Operations Facility	1A

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
20	Realign Payload Assembly & Checkout Bldg/V-25, Payload Assembly & Checkout Bldg/V-26, and Naval Surface Warfare Center/Land Based Combat Systems Lab and Performance Test Facility/Z-41	1A
21	Modify Payload Processing Facility/M-16	1A
22	Construct Rocket Assembly Building "C" Poker Flat Research Range (PFRR)	1A
23	Construct New Science Operations Center (SOC) Poker Flat Research Range (PFRR)	1A
24	Upgrade Launch Area 3 Poker Flat Research Range (PFRR)	1A
25	Construct Telemetry Facility Poker Flat Research Range (PFRR)	1A
26	Upgrade Vehicle Assembly Building (VAB) LC-36 White Sands Missile Range (WSMR)	1A
27	Transfer the ASRM Kneel Down Transporter to the Space Station Program	1A
28	Downmode Use of White Sands Space Harbor Northrup Strip, N.M.	1A
29	Cancel Proposed New Earth Observing System (EOS) Processing Facility at VAFB and Use Existing Facility	1A
30	Excess the KSC Helicopter Fleet	1A
31	Find Use For or Surplus the Currently Inactive Hypergolic Storage Facility (HSF)	1A
32	Excess the Orbiter Protective Enclosure (OPE)	1A

RANGE STANDARDIZATION AND AUTOMATION (RSA)

(ALL EASTERN/WESTERN RANGE USERS)

The Following Facilities will be included in the Scope of RSA:

- East Coast: PAFB Radar Bldg 969, Ascension Communications/Operations Bldg 12134, Antigua Communications/Operations Bldg 24911, KSC Radar Bldg 95001, Cape Radar Bldg 50166, Jonathan Dickinson Missle Tracking Annex Instrumentation Bldg 28000 (TBD; depends on degree of Navy support needed in the out-years), Tel IV Bldg 95151 at KSC, Ascension Telemetry Bldg 12283, Ascension Radar Bldg 16545, Antigua Command Bldg 34531, Antigua Telemetry Bldg 35221, Antigua Radar Bldg 34512, X-Y Communications Bldg 1641 at CCAFS and any other range site/facility that provides tracking, telemetry, command/destruct, surveillance, weather, optics, communications, and command/control of range and launch operations.

- West Coast: VAFB: Telemetry Antennas, Bldg 75; Radar Bldg 175; Radar Bldg 178; Optical Tracking Telescope, Bldg 181; Mobile Object Tracking Radar Bldg 460; Communications Center, Bldg 475; Command/Destruct Bldg 510; Radar Bldg 907; Radar Bldg 1639; Range Operations Control Center, Bldg 7000; Network Control Center, Bldg 7011; Radar Bldg 21101; Weather Station Bldg 21150; Command/Destruct Bldg 21200; OTHER: Network Control Center, Hawaii; High Frequency Transmitter/Receiver Station, Hawaii; Radar, Hawaii; Telemetry Antennas, Pillar Point; Command Destruct, Pillar Point; Radars, Pillar Point and any other range site/facility that provides surveillance, weather, optics, communications, and command/control of range and launch operations.

The RSA program seeks to consolidate, automate, and remotely control range instrumentation operations at the Eastern/Western Ranges. The RSA program will also address the consolidation of NASA operated instrumentation as well as AF operated instrumentation in support of east coast launches (including Shuttle).

The cost savings represent preliminary estimates which are being refined as the total scope of the program matures. The estimated $245M cost savings for the years 1996-2001 reflect direct range operations savings and do not include any reduction in real property maintenance costs. The estimated $105M/YR savings for 2002 and beyond reflect $100M/YR in direct range operations savings and $5M/YR in reduced real property maintenance (RPM) on facilities that will no longer be used. The VAFB portion of the estimated $5M/YR RPM savings is approximately $1.1M and may begin as early as FY 98. See Figure PPLR-1.

RANGE STANDARDIZATION AND AUTOMATION (RSA)

(ALL EASTERN/WESTERN RANGE USERS)

DESCRIPTION: The RSA program is a current initiative to consolidate, automate, and remotely control operations at the Eastern/Western Ranges. Phase I, which is underway, includes the installation of consolidated instrumentation facilities (CIFs) to replace the outdated radar, telemetry and command facilities at Antigua and Ascension Islands. Phase II will include the installation of CIFs, as well as the unmanning of facilities at Cape Canaveral, Vandenberg, Pillar PT, and other range sites as necessary.

PAYOFF POTENTIAL:
- Increased efficiency.
- Reduced manning.
- Standardized logistics support.
- Payback by 2007.

COST SUMMARY:
- Implementation cost: $800M.
- Anticipated net savings (preliminary estimates):
  - 1996 - 2001 $245M.
  - 2002 - beyond $105M/YR.

PROS:
- Lower cost for range operations/long-term O&M.
- Standardization and modernization.
- Consolidation of Range.

CONS:
- Initial investment.

STEPS TO MAKE IT HAPPEN:
- AF continue with RSA.

TASK GROUP RECOMMENDATION: HQ AFSPACECOM continue with RSA as planned.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 1A

FILE: RSA

TRANSFER THE VAFB SCOUT FACILITIES TO THE AIR FORCE/COMMERCIAL USER
(NASA, AIR FORCE) (VAFB)

The VAFB Scout facilities provide the capability for checkout, servicing, and launch of the Scout vehicle. The facilities consist of the following buildings:

- Launch Pad/580
- Blockhouse/589
- Pad Operations Support/582/584
- Ordnance Assembly Building/960
- Logistics Building/988
- Spin Test Facility/995/996/997
- Payload Processing, Scout/596

After the last Scout launch in FY 94, NASA/KSC will initiate a NASA/AF MOU transferring the facilities from NASA to the AF. The AF plans to reallocate the assets to a commercial user by initiating an AF/commercial MOU through the 30th Space Wing Space Utilization Panel. The facility O&M costs are to be picked up by the commercial user.

TRANSFER THE VAFB SCOUT FACILITIES TO THE AIR FORCE/COMMERCIAL USER
(NASA, AIR FORCE) (VAFB)

DESCRIPTION: The VAFB Scout facilities provide capability for checkout, servicing and launch of the Scout vehicle. Since the last Scout launch is scheduled for FY 94, NASA will turn over the facilities to the AF in FY94. The AF plans to reallocate assets for commercial use.

PAYOFF POTENTIAL:
- Cost savings to NASA/Air Force.

COST SUMMARY:
- Implementation costs: none.
- Total O&M Cost: $1.9M/Yr. (to be picked up by the commercial user).

PROS:
- Maintenance cost savings.
- Increase commercial launch base.

CONS:
- Difficult to reclaim asset for government use after turnover to commercial user.

STEPS TO MAKE IT HAPPEN:
- KSC to initiate NASA/AF MOU.
- 30th Space Wing Space Utilization Panel to allocate facilities for commercial use.

TASK GROUP RECOMMENDATION: Transfer the facilities from NASA to the Air Force and realign/ assign to commercial use.

DATE: 11/18/93 **REV:** 12/6/93 **CAT:** 1A

P1/WP51/STENIS-2.1A

EXCESS SC-7 SKYVAN AND L-188 ELECTRA AIRCRAFT; RECONFIGURE NASA 427, C-130Q AIRCRAFT
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The SC-7 Skyvan and L-188 aircraft will be excessed and replaced by the existing NASA 427, C-130Q aircraft for an anticipated one time cost savings of $1.35M (plus $120K/Yr in O&M). Savings cost analysis follows:

Implementation cost to modify C-130Q airframe/upgrade power supply is $150K; the combined O&M cost for the Skyvan and Electra aircraft is $120K/Yr; the O&M cost for the C-130Q aircraft is $193K/Yr.

Upgrades to the Skyvan and L-188 aircraft will not be performed because the aircraft will be excessed. Anticipated savings are: $500K (L-188 airframe inspection corrosion control); $500K (L-188 landing gear replacement); $400K (Skyvan engine repair); and $100K (Skyvan corrosion repair).

The total anticipated net savings is $1.35M (plus $120K/Yr in O&M).

The Skyvan was originally obtained to provide aerial recovery of sounding rocket payloads and was also configured to provide radar surveillance of rocket motor impact areas and to serve as a command destruct and telemetry relay aircraft for VANDAL Program launches. The Skyvan is currently in a non-flight status. The Skyvan, used as a mid-air payload retrieval aircraft and command repeater platform, will be excessed in FY94.

The L-188 Electra, a medium range aircraft that serves as a surveillance aircraft, VANDAL Project relay aircraft, and as a platform aircraft for numerous Earth Science missions, will be excessed in FY95. The L-188 is scheduled to support approved operations until the end of FY95.

The C-130Q aircraft will replace the Skyvan and the L-188 aircraft and will be configured as a surveillance and VANDAL Program relay aircraft; it would be configured for aerial recovery if a requirement develops. This aircraft is required to meet the needs of the national "Mission Model."

See Figures PPLR-2 and PPLR-3.

EXCESS SC-7 SKYVAN AND L-188 ELECTRA AIRCRAFT; RECONFIGURE NASA 427, C-130Q AIRCRAFT
(NASA) WALLOPS FLIGHT FACILITY (WFF)

DESCRIPTION: The SC-7 Skyvan and L-188 aircraft will be excessed and replaced by the existing NASA 427, C-130Q aircraft. The Skyvan is used as a mid-air payload retrieval aircraft & command repeater platform and is currently in a non-flight status. The L-188 Electra is a medium range aircraft used for range surveillance and is scheduled to support approved operations until the end of FY95.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:

- Implementation costs:	\$150K (modify C-130Q airframe/upgrade power supply).
- Combined O&M costs:	\$120K/Yr (Skyvan & Electra aircraft).
- O&M cost:	\$193K/Yr (C-130Q aircraft).
- Anticipated savings:	\$500K (L-188 airframe inspection corrosion control). \$500K (L-188 landing gear replacement). \$400K (Skyvan engine repair). \$100K (Skyvan corrosion repair).

PROS: - Newer C-130Q (built 1981) vs older L-188 (built 1960).

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - NASA/WFF to excess Skyvan aircraft immediately and the L-188 aircraft in FY95 via current GSA disposal procedures.

TASK GROUP RECOMMENDATION: NASA/WFF proceed with excess of Skyvan aircraft immediately and Electra aircraft by the end of FY95. Upgrade C-130Q aircraft airframe and power supply systems.

DATE: 1/13/94 **REV:** 2/3/94 **CAT:** 1A

DOWNGRADE OF THE LAUNCH EQUIPMENT TEST FACILITY (LETF)
(NASA) (KSC)

The LETF is a "one-of-a-kind" test facility used to develop and verify the operation of major launch pad umbilical systems to ensure that they react properly when exposed to dynamic loads and movements experienced during a launch. Major components of the LETF are:

Active Facilities

- 600-ton Proofload Test Fixture
  - Load test NASA and Air Force lifting/handling equipment
  - SRM lifting beams
- SRB Holddown Post-Test Fixture
  - Holddown post shim testing
  - Holddown post strain gage calibration
- Control Room
  - Supports SRB holddown post-test fixture
  - Supports component test program
  - Supports 600-ton proofload test fixture
- Hydraulic Pumping Units
  - Supports SRB holddown post-test fixture
- Cryogenic/Pneumatic Systems
  - Supports component testing
  - Facility purges

Inactive Facilities

- Tail Service Mast/external tank H_2 vent line random motion and liftoff simulator
  - Preventive maintenance
- Orbiter Access Arm/gaseous oxygen vent arm random motion simulator
  - Preventive maintenance

The inactive facilities have been maintained to preserve this unique test capability in case of certain STS launch umbilical failure or STS design changes requiring retest. Since there is no mission requirement to maintain the inactive facilities in operational condition, the maintenance efforts are being decreased, resulting in a cost savings of $200 K/Yr.

See Figure PPLR-4.

DOWNGRADE OF THE LAUNCH EQUIPMENT TEST FACILITY (LETF)
(NASA) (KSC)

DESCRIPTION: The LETF is a "one-of-a-kind" test facility used to develop and verify the operation of major launch pad umbilical systems to ensure that they react properly when exposed to dynamic loads and movements experienced during a launch. This recommendation is to decrease maintenance efforts on inactive test fixtures since there is no mission requirement to maintain these test fixtures in operational condition.

PAYOFF POTENTIAL: - Cost savings to the STS program.

COST SUMMARY:
- Implementation costs: none.
- Current O&M cost 1.8M/Yr.
- Anticipated cost savings of $200K/Yr.

PROS: - Shuttle program cost savings

CONS:
- Certain STS launch equipment failure could result in extended launch delays without ready-to-use test facility.
- Maintenance support contract adjustment

STEPS TO MAKE IT HAPPEN:
- KSC-DE to make Support Contract adjustment.
- Support contractor to make revision to preventative maintenance procedures.

TASK GROUP RECOMMENDATION: Downgrade maintenance activities on the Orbiter Access Arm (OAA)/Gaseous Oxygen (GOX) Vent Arm Random Motion Simulator and the Tail Service Mast (TSM)/External Tank (ET) Hydrogen Vent Line Random Motion and Lift-Off Simulator.

DATE: 11/18/93 **REV:** 12/6/93 **CAT:** 1A

BUILD NEW FUELS LABORATORY AND DEMOLISH OLD BUILDINGS
(DOD, NASA, COMMERCIAL) (VAFB)

Building 7422 is the only laboratory at Vandenberg or in the local area for sampling and testing rocket propellants and petroleums. This laboratory provides critical support for launch operation by (a) ascertaining the quality of aerospace propellants, gases, cryogenics, lubricants, and hydraulic fluids; (b) monitoring after launch environmental conditions; and (c) identifying contaminants which could cause malfunctions or failure in missile payloads and ground support parts and systems.

The laboratory was constructed in 1963 and has been expanded three times. The older portions of the original facility have been deteriorating. Building structural deficiencies cause severe operational problems due to vibration of sensitive analytical laboratory equipment. The environmental control system, electrical wiring, and quantity distance requirements are no longer met. During November 1992,
SA-ALC/FMFCC published an Economic Analysis that evaluated four alternatives, to resolve this critical launch support requirement, based on an hourly average rate for tests/test costs. The four alternatives analyzed status quo operations, status quo plus augmentation, new construction, and complete contract services. The 50-year life cycle cost (LCC) analysis identified status quo operations projected at $19.3M, status quo plus augmentation at $57.4M, new laboratory operations at $21.3M, and complete contracting at $104.8M. Simplified straight-line calculations indicate a $40K per year O&M savings and a $722K per year net savings.

Overall workload to support Vandenberg AFB operations is projected to increase during the next five years. The new laboratory will provide capability to perform an additional 7000 tests annually.

See Figure PPLR-5.

BUILD NEW FUELS LABORATORY AND DEMOLISH OLD BUILDINGS
(DOD, NASA) (VAFB)

DESCRIPTION: Building 7422 is the only laboratory at Vandenberg or in the local area for sampling and testing rocket propellants and petroleums. The 20,000 square foot concrete block building is structurally and environmentally unsound for a laboratory and a new facility will be constructed in FY95. Structural deficiencies are causing severe operational problems due to vibration of sensitive measurement equipment. Temperature and humidity fluctuations affect the accuracy and reliability of test results.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY: -Implementation Costs: $4M
-Anticipated Net Savings: $722K/Year

PROS:
- Improve efficiency and lower operating costs.
- Increased capability..

CONS:
- Upfront funds for building demolition, new construction, and modernized equipment

STEPS TO MAKE IT HAPPEN:
- HQAF/AFSPACECOM allocated $4M for MILCON project
- 30 SPW proceed with funded $4M new laboratory project

TASK GROUP RECOMMENDATION: Recommend FY95 MILCON approval to build new fuels laboratory.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 1A

COMMERCIAL USE OF ADVANCED BALLISTIC REENTRY SYSTEM (ABRES) A&B AND 576E
(DOD, DOT, COMMERCIAL) (VAFB)

The ABRES A pad was designed to provide launch azimuth capability of 270-295 degrees. One pad at ABRES A , pad A3, is being used by American Rocket Company (Amroc) for their test launches. A3, at 10% utilization by Amroc has a gantry and a 1.5 ton crane with a 108' hook height. The facility is rated for Class 1.1 propellants with a TNT Equivalent of 52,000 and a Quantity Distance Circle of 2,920 feet. Two additional ABRES A pads could be used to support commercial or government launches.

ABRES B is being used by E'Prime to support the Eagle program. Building 1820 is being used for storage and Building 1835 is being requested by E'Prime to modify for Eagle processing. The facility has two bays which can be made into one. Both buildings are 8,869 square feet. Building 1820 can support Class 1.1 propellant with a TNT equivalent of 52,000 lbs. with a Quantity Distance Circle of 2,920 feet. Building 1835 is the same except the Quantity Distance Circle is 1,520 feet.

576E is currently being used to launch the Taurus vehicle. 576E is the only ballistic launch pad which can be used for Space launches with a dog leg penalty. Taurus has two additional launches on the manifest in FY97 and may use the pad after the first launch for commercial launches. The facility has a 210 degree azimuth launch capability for up to 2,000 pound spacecraft. It contains a 2,000 gallon perimeter containment trough, hold down bolts, and is approved for 52,000 lb. TNT Equivalent Class 1.1 propellants with a Quantity Distance Circle of 1,875 feet.

Realigning the O&M for utilities, service contracts, and planned repair costs to the respective commercial contractors using pads A1, B1, and 576E will save $181,000.

Support the 30 SPW Space Utilization Panel assignment of these facilities to Commercial Users. Commercial users will pay the appropriate portion of the O&M once Air Force Instruction 10-1205 is implemented.

See Figure PPLR-6.

COMMERCIAL USE OF ADVANCED BALLISTIC REENTRY SYSTEM (ABRES) A&B AND 576E
(DOD, DOT, COMMERCIAL) (VAFB)

DESCRIPTION: These facilities are old Atlas bunkers/silos which are being provided to Commercial companies. ABRES A site contains three pads that provides launch azimuth capability of 270-295 degrees. Pad A3 had been modified by American Rocket Company (AMROC) for their launches. At ABRES B Building 1820 has been assigned to E'Prime for parts storage. E'Prime is asking for Building 1835 to modify for Eagle processing. Facility 576E (Building 1611) is a concrete launch pad. It is the only ballistic launch pad which can be used for polar space launches of a 210 degree azimuth with a dog leg penalty. This pad is assigned to Taurus until FY97.

PAYOFF POTENTIAL:- Cost avoidance.

COST SUMMARY:	- Implementation Costs:	$0
	- O&M Costs:	$181K/YR
	- Anticipated Net Savings:	$181K/YR

PROS:
- Facilities could be reassigned to a commercial company.
- O&M costs would be paid by Commercial Users.
- Commercial company responsible for upgrading facilities to meet Safety/Fire codes.

CONS:
- Limited Government use.

STEPS TO MAKE IT HAPPEN:- 30 SPW to realign to Commercial Users.

TASK GROUP RECOMMENDATION: 30 SPW Space Utilization Panel in accordance with Air Force Instruction 10-1205 assign appropriate O&M charges to each Commercial Space user.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** IA

MODIFY ABOVE GROUND EXPLOSIVE STORAGE MAGAZINE/M-20
(NASA/DOT/DOD) WALLOPS FLIGHT FACILITY (WFF)

This facility will be modified to a Pegasus vehicle ordnance and rocket assembly building in FY94 to support the NASA SELVS/DoD/Commercial Pegasus Program at WFF. This facility currently houses rocket motors for the NASA Suborbital Science (Sounding Rocket) Program in support of the national "Mission Model."

M-20 is currently a rocket motor storage building located on the WFF Main Base. This facility will be modified to a Pegasus vehicle ordnance and assembly building to support the Pegasus Program. Orbital Sciences Corporation (OSC) is funding the $500K modification, however the building will continue to be U. S. Government property. The location of this Pegasus facility on the WFF Main Base provides direct access to the WFF Research Airport.

Recommend Orbital Sciences Corporation fund the modification in FY94 to meet the national "Mission Model."

See Figure PPLR-7.

MODIFY ABOVE GROUND EXPLOSIVE STORAGE MAGAZINE/M-20
(NASA/DOT/DOD) WALLOPS FLIGHT FACILITY (WFF)

DESCRIPTION: This facility will be modified to a Pegasus vehicle ordnance and rocket assembly building in FY94 to support the NASA SELVS/DoD/Commercial Pegasus Program from WFF. This facility currently houses rocket motors for the NASA Suborbital Science (Sounding Rocket) Program in support of the national "Mission Model."

PAYOFF POTENTIAL: - Support commercial program.

COST SUMMARY:

- Implementation costs: $500K (not to Government).
- O & M cost: $36K/Yr.
- Anticipated net savings: $25K/Yr (to Government).

PROS:

- Support "Commercialization of Space".
- Facility will continue to be U.S. Government property.
- Pegasus Vehicle Assembly Building with access to WFF Research Airport.

CONS:

- Net reduction of 11,585 square feet of rocket motor storage area..

STEPS TO MAKE IT HAPPEN: - NASA/WFF and Orbital Sciences Corp (OSC) to comply with "in place" Memorandum Of Understanding.

TASK GROUP RECOMMENDATION: NASA/WFF and OSC to complete Individual Support Agreement.

DATE: 1/13/94 **REV**: 1/13/94 **CAT: 1A**

MOTHBALL PAD 3A SCOUT LAUNCHER COMPLEX/W-96
(NASA/DOT) WALLOPS FLIGHT FACILITY (WFF)

This facility will be mothballed and offered to commercial users. This facility is an environmentally controlled shelter housing a Scout launcher and associated equipment. Approximately 40 Scout vehicles have been launched from WFF since 1960. The Scout Program will end in 1994 and no more Scout launches are scheduled from WFF to support the national "Mission Model."

There will be approximately $20K in savings per year when Pad 3A is closed. Several potential commercial and government users have expressed an interest in launching from Pad 3A, however no definite users have been identified.

Recommend NASA/WFF mothball Pad 3A Scout launcher complex at WFF in FY94 and offer to commercial users.

See Figure PPLR-8.

MOTHBALL PAD 3A SCOUT LAUNCHER COMPLEX/W-96
(NASA/DOT) WALLOPS FLIGHT FACILITY (WFF)

DESCRIPTION: This facility is an environmentally controlled shelter housing a Scout launcher. No more U.S. East Coast Scout launches are scheduled in the national "Mission Model" therefore, this facility will be mothballed and offered to commercial users.

PAY OFF POTENTIAL: - Support commercial program.

COST SUMMARY:
- Implementation costs: $1K.
- O&M costs: $22K/Yr.
- Anticipated net savings: $20K/Yr.

PROS: - Scout launcher available for commercial user.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN:
- NASA/WFF to mothball facility.
- NASA/WFF to advertise in Commerce Business Daily to commercial users in FY94.

TASK GROUP RECOMMENDATION: NASA/WFF to mothball facility and make available to commercial users by end of FY94.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

ASSIGN SPACE LAUNCH COMPLEX 6 ADMINISTRATIVE FACILITIES FOR COMMERCIAL USE
(DOD, DOT, COMMERCIAL) (VAFB)

Administrative support buildings located within the SLC-6 Launch Pad Complex fence provides convenient administrative space for launch operations personnel. The Ready Building (384) has 14,040 square feet of administrative space, the Operations Support Building (394) has 7,200 square feet of administrative space, and the Complex Services Building (399) has 12,400 square feet of administrative space.

These facilities are part of the mothballed SLC-6 Complex but support processing of small missile items and are used to store SLC-6 engineering data. Providing these facilities to commercial users will facilitate reactivating the SLC-6 launch capability for small/medium commercial space users.

Providing these facilities to commercial users will transfer the appropriate percentage of the O&M and maintenance cost from the Air Force to the commercial users.

Estimated annual O&M, the majority in utilities, is $54,000. O&M costs for Buildings 384 and 394 ($33,000) will be picked up by Lockheed, a commercial user, who will be launching the Lockheed Launch Vehicle from SLC-6.

Recommend support of the 30 SPW Space Utilization Panel assignment of facilities to Lockheed or other qualified commercial venture who will pay their appropriate portion of the O&M in accordance with Air Force Instruction 10-1205 to be implemented.

See Figure PPLR-9.

ASSIGN SPACE LAUNCH COMPLEX 6 ADMINISTRATIVE FACILITIES FOR COMMERCIAL USE

(DOD, DOT, COMMERCIAL) (VAFB)

DESCRIPTION: Three administrative support buildings within the Space Launch Complex (SLC) 6 provide convenient administrative space for launch operations and should be assigned to commercial users.

PAYOFF POTENTIAL: - Cost avoidance.

COST SUMMARY:

	- Implementation Costs:	$0
	- O&M Costs:	$54K/YR
	- Anticipated Net Savings:	$33K/YR

PROS:
- Space launch assets will be preserved.
- O&M will be paid by a Commercial User.

CONS:
- Lack of maintenance will require refurbishment.
- Require development of multiple user schedule for both DoD and Commercial interests.

STEPS TO MAKE IT HAPPEN: 30 SPW to develop space allocation and scheduling sequence that will optimize facility use.

TASK GROUP RECOMMENDATION: 30 SPW Space Utilization Panel to assign facilities to commercial users and assess O&M charges.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 1A

ASSIGN SPACE LAUNCH COMPLEX 6 LAUNCH PAD AREA FOR COMMERCIAL USE
(DOD, DOT, COMMERCIAL) (VAFB)

SLC-6 provides approved polar launch capability for a variety of boosters up to Shuttle class. The concrete pad area is 128' x 1268'. On the surface are rails on which the Payload Changeout Room (PCR), Shuttle Assembly Building (SAB), and Mobile Service Tower (MST) are driven by their individual trucks. The 270' MST has two bridge cranes and one hoist. The PCR is used to transfer payloads from the payload preparation room to the launch vehicle. The SAB provides environmental protection for the missile during processing operations. It is 219' high and has a 125 ton bridge crane and a 15 ton auxiliary crane. The Launch Mount housed inside the MST is a structural steel framed, steel plate covered shuttle support structure capable of handling 6 million pounds of thrust. The Access Tower, the tallest structure on the pad, is mobile and provides access to all levels of the shuttle and emergency egress. There are storage and handling systems for fuels, helium, oxidizer, liquid hydrogen, and propane. The complex has self contained environmental control and waste processing systems. The complex is completely fenced and has two entry control buildings. Facilities have been mothballed since 1987.

The launch area contains trace amounts of hydrazine; $2.1 million clean up cost will be required in order to totally abandon. Corrosion control was discontinued and Safety has restricted some areas as unsafe due to corrosion. The facilities are being made available to test programs and commercial users. As commercial operators are assigned areas, they will pick up their appropriate percentage of the O&M. In addition, use of the facilities by commercial operators will help keep the space launch asset maintained.

The Government is currently spending $84,000 per year for O&M. O&M for the launch pad assigned to Lockheed and McDonnell Douglas is $62,000.

The 30 SPW Space Utilization Panel has assigned the launch pad to Lockheed and McDonnell Douglas for commercial launches. Commercial Users will pay the appropriate portion of the O&M once Air Force Instruction 10-1205 is implemented.

See Figure PPLR-9.

ASSIGN SPACE LAUNCH COMPLEX 6 LAUNCH PAD AREA FOR COMMERCIAL USE
(DOD, DOT, COMMERCIAL) (VAFB)

DESCRIPTION: Space Launch Complex (SLC) 6 was originally built for the West Coast Shuttle launches. The complex has self contained environmental control and waste processing systems. Facilities were being reserved for the National Launch System. The facilities are partially mothballed and are being made available to DoD test programs and commercial users. Two commercial companies have been given approval to use the launch mount.

PAYOFF POTENTIAL: - Cost avoidance.

COST SUMMARY:

- Implementation Costs:	$0.
- O&M Costs:	$84K/YR
- Anticipated Net Savings	$62K/YR

PROS:
- Commercial operators are assigned appropriate percentage of the O&M.
- Use and maintenance will restore space launch asset.

CONS:
- Corrosion control has been discontinued.
- Safety has restricted some areas as unsafe due to corrosion and fire prevention.
- Requires development of multiple user schedule for DoD and Commercial interests.

STEPS TO MAKE IT HAPPEN: - 30 SPW to develop formula for commercial users O&M allocations and create multiple program scheduling sequences.

TASK GROUP RECOMMENDATION: Agree with 30 SPW Space Utilization Panel assignment to commercial users for launch pad area and assess O&M charges.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 1A

ASSIGN SPACE LAUNCH COMPLEX 6 PAYLOAD PREPARATION ROOMS FOR COMMERCIAL USE
(DOD, COMMERCIAL) (VAFB)

The Payload Preparation Room (PPR) provides capability to process multiple Shuttle class payloads in the Space Launch Complex 6 (SLC-6) area. This facility consists of a large receiving bay, two large processing bays, and three processing cells. The facility is approved for Class 1.1 explosives with a Quantity Distance Circle of 1,250 feet and a TNT Equivalence of 2,800 lbs. There is a propellant loading and waste storage system.

The PPR, Building 375, is 103,830 square feet. Bay 1 is 43' x 100' x 30' and has two five-ton cranes with a 35-foot hook height. Bay 2 is 97' x 173' x 30' and has one 75-ton crane with a 58-foot hook height. Each of the three cells is 35' x 44' x 69' high and has a five-ton bridge crane. There is a 100,000 class clean room with EMI shielding. The PPR is located within the secured fenced area on SLC-6.

The facility, partially mothballed for six years, was recently assigned to SMC/Det 9 for Taurus, who is sharing occupancy with a commercial space launch operator, Western Commercial Space Center (WCSC). Once Det 9 returns the PPR to 30 SW, WCSC will request to lease/license the facility. WCSC is currently investing money in the PPR for repair and cleanup. The funding for this activity is estimated at $1M of $2.3M grant money provided from the AF Dual-Use Grant program. Negotiations are underway with WCSC for a Commercial Agreement Annex that will satisfy and protect the future interests of both the government and commercial user.

Annual O&M for the facility has ranged from $75,000 to $343,000. Costs included are $163,000 for utilities, $166,000 for contract services (refuse, grounds, custodial), and $14,000 in planned repairs. These costs will be born by WCSC.

See Figure PPLR-96.

ASSIGN SPACE LAUNCH COMPLEX 6 PAYLOAD PREPARATION ROOMS FOR COMMERCIAL USE
(DOD, COMMERCIAL) (VAFB)

DESCRIPTION: Building 375 provides the capability to process multiple Shuttle class payloads. The Payload Preparation Room (PPR) consists of a large receiving bay, two large processing bays, and three processing cells. The building has been mostly unused since 1986 because it is too costly to maintain and too large for most programs. Western Commercial Space Center (WCSC) requested the facility for commercial payload processing and, possibly, payload integration to small boosters. The Wing Commander sent WCSC a letter of tentative assignment pending outcome of negotiations between WCSC and the Government.

PAYOFF POTENTIAL: - Cost avoidance.

COST SUMMARY:

- Implementation Costs:	$0
- O&M Costs:	$343K/YR
- Anticipated Net Savings:	$343K/YR

PROS:
- Facilitate commercialization of the Space Industry.
- Spacelift asset will be put back into service.
- All O&M will be paid by commercial users.

CONS:
- If conveyed by lease agreement, Government will relinquish "dual use" status. Services purchased could exceed maintenance costs.
- If conveyed by license agreement, WCSC faces financial risk if facility use is preempted by a Government program.

STEPS TO MAKE IT HAPPEN: - 30 SW consummate conveyance agreement.

TASK GROUP RECOMMENDATION: 30 SW proceed with assignment of facility to WCSC and negotiate a commercialization agreement with WCSC.

DATE: 11/18/93 **REV:** 03/29/94 **CAT:** 1A

DO NOT STANDDOWN ONE SHUTTLE LAUNCH PAD
(NASA) (KSC)

The Space Shuttle launch pads (LC-39A and LC-39B) were originally constructed at KSC in the 1960's to support the launch of the Apollo Saturn V Moon Rocket and were modified for the Shuttle program. The pad is an integral part of the LC-39 integrate, transport, and launch (ITL) concept for Shuttle processing and launch. Each launch pad provides final propellant servicing (LOX, LH_2, hypergol), payload installation at the pad, crew ingress/egress, and final test/checkout and preparations for launch. The major pad structures include a concrete hardstand with flame trench, a fixed-service structure, and rotating structure which includes a payload changeout room for payload installation and servicing.

NASA submit to OMB for FY 95 includes a pad standdown. However, since return-to-flight, the historical average planned 30 calendar days at the pad plus 6-day pad refurbishment, plus 10.8-day average launch slip equals 46.8 days per pad, or <u>theoretically</u> 7.5 flights per year pad capability. Therefore, although planning can reflect the ability to achieve 8 flights per year using one pad, historical pad processing times indicate that the probable rate will be less. Eight flights per year using one pad has never been achieved and has only been achieved once (FY 91) using two pads since return-to-flight.

Using one pad, every launch delay compresses subsequent flow of that vehicle and subsequent flow of vehicles awaiting to go to the pad. Overtime cost would be incurred to recover from launch delays. A cost of $3.8 million can be saved if one pad is placed in a standdown mode with the ability to reactivate within 6 months. Estimated KSC overtime costs to achieve 8 flights per year, based on actual historical data and utilization of one pad, equals $5.75 million. (Does not include cost to customer and all supporting organizations due to launch delays.)

Implementation of a launch pad standdown would result in high risk to achieving launch rate and potentially no cost savings and is not recommended. Availability of two launch pads will ensure the ability to achieve the mission model of 8 flights per year and comply with corrosion control and other pad maintenance requirements.

See Figure PPLR-10.

DO NOT STANDDOWN ONE SHUTTLE LAUNCH PAD
(NASA) (KSC)

DESCRIPTION: NASA submit to OMB for FY 95 includes a pad standdown. However, since return-to-flight, the historical average planned 30 calendar days at the pad plus 6-day pad refurbishment, plus 10.8-day average launch slip equals 46.8 days per pad or <u>theoretically</u> 7.5 flights per year pad capability. Therefore, although planning can reflect ability to achieve 8 flights per year using one pad, historical pad processing times indicate that the probable rate will be less.

PAYOFF POTENTIAL:
- Ability to meet mission model.

COST SUMMARY:
- Implementation costs: Add \$3.8M to FY 95 budget.
- \$3.8 M can be saved if one pad is placed in a standdown mode with ability to reactivate within 6 months.
- Estimated KSC overtime costs to achieve 8 flights per year based on utilization of one pad = \$5.75 M. (Does not include cost to customer and all supporting organizations due to launch delays.)

PROS:
- Historically since return-to-flight, launch delays have extended pad stay times by 10.8 days per flow.
- Using one pad, every launch delay compresses subsequent flow of that vehicle and subsequent flow of vehicles awaiting to go to the pad. Overtime cost would be incurred to recover from launch delays.
- 8 flights per year using one pad has never been achieved and has only been achieved once using two pads since return-to-flight (FY 91).

CONS:
- Based on average planned 38-day pad utilization per flow, the Shuttle manifest can reflect ability to plan 8 flights per year using one pad.
- 63 Contractor full-time employees will not be eliminated (\$3.8 million savings/year).

STEPS TO MAKE IT HAPPEN:
- NASA/OSF reassess savings vs. risk of standing down one pad.

TASK GROUP RECOMMENDATION: Shuttle Program Office should reassess savings vs. risk to maintain 8/yr flight rate. Implementation of standing down one pad would result in high risk to achieving launch rate and potentially no cost savings. <u>Availability of two launch pads will ensure ability to achieve mission model of 8 flights per year</u> and comply with corrosion control and other pad maintenance requirements.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 1A

P1/WP51/STENIS-2.1A

DO NOT CONSTRUCT SPACE SHUTTLE MAIN ENGINE SHOP
(NASA) (KSC)

The current Space Shuttle Main Engine (SSME) shop is located within the Vehicle Assembly Building (VAB) and can process a maximum of three SSME's, using vertical workstands. The shop presently supports the current flight rate of eight launches per year.

Originally, the SSME shop performed limited problem solving while normal checkout of the engines was done on the Orbiter in the Orbiter Processing Facility (OPF). However, post-Challenger processing changes have placed much greater demands on the offline engine shop. To minimize OPF turnaround time, SSME's are now removed from the Orbiter for offline processing in the shop while the Orbiter is in the OPF. Additionally, the shop must provide a "flight ready" spare engine set for on-pad changeout. The very limited work space coupled with engine storage requirements increases the risk of accidental damage to multi-million dollar engines while processing them within the shop. Alternate space is needed and is available within the VAB or other existing facilities to resolve these problems.

A secondary problem is exposure of SSME shop personnel and flight hardware to safety hazards posed by the solid rocket motors in the VAB. This problem would be eliminated by modification of an existing facility other than the VAB.

DO NOT CONSTRUCT SPACE SHUTTLE MAIN ENGINE SHOP
(NASA) (KSC)

DESCRIPTION: The Space Shuttle Main Engine (SSME) Shop is currently housed in the Vehicle Assembly Building (VAB) at Kennedy Space Center (KSC). An FY 95 Construction of Facilities (CofF) request was made to build a new SSME Shop. Modification of an existing facility other than the VAB, in lieu of constructing a new facility, reduces costs and solves both space and safety problems in the VAB.

PAYOFF POTENTIAL: - Cost avoidance.

COST SUMMARY:
- Cost to modify an existing facility (VAB or other): $6M.
- Cost to build and outfit new facility: $9.3M.

PROS:
- Deletes new construction.
- Eliminates personnel exposure to safety hazards.
- Makes use of existing facility.

CONS:
- SSME personnel and flight hardware will continue to be exposed to safety hazards associated with SRB processing in the VAB.

STEPS TO MAKE IT HAPPEN:
- Cancel CofF project.
- Modify existing facility to meet SSME processing requirements.

TASK GROUP RECOMMENDATION: Code M to evaluate SSME processing requirements, modify an existing facility other than the VAB to provide sufficient SSME processing space, and protect/maintain flight hardware and personnel. Code M to cancel CofF project for new facility.

DATE: 9/20/93 **REV:** 04/01/94 **CAT:** 1A

P1/WP51/STENIS-2.1A

ABANDON PAD 4/W-30
(NASA) WALLOPS FLIGHT FACILITY (WFF)

This launch pad on Wallops Island will be abandoned in FY94. Launch Area 4 contains a launcher with a capacity of 20,000 lbs and is inactive. Numerous NASA and other agency sounding rockets have been launched from Pad 4 over the past 30 years.

For the past 5 years no rockets have been launched from this Pad because of two factors: 1) the Pad's northern location on Wallops Island limits launch azimuth selection (due to populated Assateague Island); and 2) the Pad's relatively close proximity to the Navy's Aegis Facility (2500ft) requires evacuation of the Aegis Facility during launch activities. Other launch pads on the southern part of Wallops Island are available to support the current and projected launch schedule in meeting the requirements of the mission model.

See Figure PPLR-11.

ABANDON PAD 4/W-30
(NASA) WALLOPS FLIGHT FACILITY (WFF)

DESCRIPTION: This launch pad will be abandoned in FY94. Launch Area 4 contains a launcher with a capacity of 10 tons and is inactive.

PAYOFF POTENTIAL: - Cost Savings.

COST SUMMARY:
- Implementation costs: $0.
- O&M maintenance costs: $5K/Yr.
- Anticipated net savings: $5K/Yr.

PROS: - No maintenance costs.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - NASA/WFF abandon in place.

TASK GROUP RECOMMENDATION: NASA/WFF abandon in place as facility is no longer required to meet mission model.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

COMMERCIAL SPACE ACTIVITIES
(DOT, NASA, DOD)

In FY93, the Air Force awarded six Grants in amounts from $1.1M to $2.35M. Awards were made through a competitive review process and in full cooperation with NASA and DOT. A similar FY94 project selection review is tentatively scheduled for May 94. The six FY93 projects are described below:

- Spaceport Florida Authority is developing Launch Complex 46 at Cape Canaveral for DoD and commercial small-class launch vehicles, approximately 3200 pounds to Low Earth Orbit (LEO).
- The Western Commercial Space Center will operate a limited Payload Processing Room (PPR) at Space Launch Complex 6 (SLC-6) on Vandenberg AFB for small commercial research payloads and is beginning work on a "generic" launch pad at Cypress Ridge, CA, capable of supporting 2600-pound launches to LEO.
- The Southwest Regional Spaceport (New Mexico) is conducting environmental, range safety, facility, and requirements analyses for a potential spaceport to be located in New Mexico. This project was originally intended for Single-Stage-to-Orbit, but could be applicable to other users.
- Alaska Aerospace Development Corporation is developing a Space Orbital Launch Facility at Poker Flats Research Range, which includes environmental assessment, site survey, and initial launch complex constructions for small launch vehicles (3000 pounds to LEO).
- Astrotech Space Operations is building a payload processing facility at Vandenberg AFB for Iridium Comsats, the Midcourse Space Experiment, and the Earth Observation System.
- The Practical Innovations Company is assessing how the Air Force can best support the commercial space launch infrastructure needs for current and future systems to enhance industry competitiveness in the international market.

COMMERCIAL SPACE ACTIVITIES
(DOT, NASA, DOD)

DESCRIPTION: The Space Competitiveness Act of 1991 allowed the DOT to make Grants for selected projects to assist the U.S. commercial launch sector. Defense Appropriations Acts for FY93 and FY94 each appropriated $10M for development of dual-use (DoD and commercial) space launch facilities and designated the Air Force as lead for the Federal Grant Program. The Air Force matches up to 75 percent of the total cost for suitable projects.

PAYOFF POTENTIAL: - Develop dual-use Government and commercial capabilities.

COST SUMMARY: - $10M in both FY93 and FY94 with matching funds provided by the grantee (Air Force).

PROS:
- Supports the intent of the Commercial Space Act.
- Expanded use of existing infrastructure (range, etc.) to the benefit of users.
- Public/private sector "partnering" focused on growth areas.
- Strong Congressional support.

CONS:
- Those projects still in the study phase may require additional financing and state support.
- Projects may not pan out as the market for commercial space ports is speculative.

STEPS TO MAKE IT HAPPEN: - DOT and/or DOC continue efforts to make the Grant Program part of DOT or DOC budget.

TASK GROUP RECOMMENDATION: Continue AF FY93 and FY94 Grant programs, continue Federal infrastructure investment program, and DOT/DOC continue advocating the dual-use program as a DOT/DOC budget line item. Grant programs should encourage shared use of Government facilities when beneficial for return on investments and meeting national spacelift requirements.

DATE: 11/18/93 **REV:** 2/1/94 **CAT:** 1A

CONTINUE ACTIVATION OF THE

RANGE OPERATIONS CONTROL CENTER (ROCC)

(AIR FORCE) (CCAFS)

The Range Operations Control Center (ROCC) serves as the central point for range safety and range control for missile and space launches from CCAFS and KSC. Support provided by this facility includes mission planning, scheduling, oversight of range operations, and network support for Shuttle launch, on-orbit and landing support. Range safety consoles are located in the ROCC and allow range safety officers to track the actual launch vehicle position against predetermined flight path limits; destruct signals are commanded from the ROCC when flight safety limits are violated. The ROCC houses two high bay areas (range safety control and consoles for various range control and user functions), offices and support areas. The ROCC also combines the functions previously performed in the Range Control Center (RCC)--including the weather operations center--and the Central Computer Complex (CCC). The RCC and CCC are old facilities constucted over 40 years ago. It has become impossible to maintain and find parts for these facilities/equipment items to keep them in an operational status. These facilities have exceeded their economic useful life and are currently being replaced by the ROCC.

Further consideration of the consolidation of control functions at the launch bases will be accomplished under the Range Standardization and Automation (RSA) program which may result in the movement of other functions into the ROCC.

The $152M implementation cost consists of $19M for facility construction and $133M for equipment.

See Figure PPLR-12.

FILE: ROCC1

CONTINUE ACTIVATION OF THE RANGE OPERATIONS CONTROL CENTER (ROCC)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility supports the mission model for all launches from CCAFS and KSC and serves as a consolidated Range and launch management center. This facility consolidates functions previously performed in the Range Control Center (RCC) and Central Computer Complex (CCC). The ROCC is undergoing operational certification. Current facilities have reached the end of their economically useful life and continued use of them endangers mission accomplishment.

PAYOFF POTENTIAL: - Operations efficiency.

COST SUMMARY: - Implementation cost: $152M.

PROS:
- Upgrades aging range control capability.
- Increases operational efficiency.

CONS: - Initial capital investment.

STEPS TO MAKE IT HAPPEN:
- Air Force Material Command (AFMC) continue acquisition and checkout.
- 45 SPW continue with planned turnover and activation.

TASK GROUP RECOMMENDATION: Air Force continue activation of the ROCC.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 1A

FILE: ROCC

MODIFY COMPLEX (CX) 46 FOR SMALL COMMERCIAL BOOSTERS

(AIR FORCE/NAVY/DOT) (CCAFS)

CX 46 is used by the Navy to support operational testing of the Trident II missile program. This complex has some existing facilities which can be used by the Spaceport Florida Authority (SFA) in support of commercial small launch vehicles (SLVs). The existing launch site includes a launch mount, mobile service tower, flame duct, lightning protection system, gantry crane and associated rails, ordnance test shed, and a support building. Any modifications made by the SFA to these existing structures must preserve the capability to support operational testing of the Trident II. SFA plans to remove the existing launch mount and replace it with a new one to support SLVs. The existing mobile service tower will not be used but will be moved to a stow position. A new mobile service structure will be designed and will use the existing gantry rails. The existing 110 ton overhead gantry crane will be utilized. The four 90 foot tall lightning protection poles will be replaced with new 140 foot tall poles to accommodate taller launch vehicles. No modifications are required for the flame duct, ordnance test shed (used to test small ordnance) and the support building (a small facility used for equipment staging, office and shop areas). In addition, SFA plans to construct a new umbilical mast foundation (the Trident umbilical mast will be removed/preserved), a new communications trench, a new utility apron and a new utility trench. Other enhancements are contemplated but sufficient funding may not be available. For example, SFA is considering the construction of an 8,000 SF Stage Integration Site (SIS) facility to provide a ventilated, weatherproof area for vehicle stage integration tasks.

The spaceport Florida Authority (SFA) is a state agency chartered to facilitate the commercial space launch business in Florida. The SFA is actively seeking opportunities to form partnerships with DoD and private industry to better meet the needs of the commercial space launch industry.

See Figure PPLR-13.

FILE: CX461

MODIFY COMPLEX (CX) 46 FOR SMALL COMMERCIAL BOOSTERS

(AIR FORCE/NAVY/DOT) (CCAFS)

DESCRIPTION: This facility is required by the Navy to support operational testing of the Trident II missile program. Although the Trident II missile is already operational CX 46 must be retained for potential follow-on testing should the program experience any operational problems. The Navy is also actively working with Spaceport Florida who wants to add the capability to launch small commercial boosters using grant money provided by the FY 93 dual use Air Force grant program.

PAYOFF POTENTIAL: - Supports national objective to facilitate the commercial launch industry.

COST SUMMARY:
- Implementation cost: $2.1M Air Force grant.
- O&M costs: $82K/YR.
- Anticipated net savings: none to DoD/NASA.

PROS:
- Better utilization of launch facilities.
- Supports national goal of encouraging commercial launches.

CONS: - Potential scheduling interference with the Navy.

STEPS TO MAKE IT HAPPEN: - Spaceport Florida continue to work with the Navy to reach agreement on utilization of CX 46.

TASK GROUP RECOMMENDATION: Spaceport Florida continue initiative to modify CX 46 for use by small commercial boosters.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 1A

FILE: CX46

CONSTRUCT CENTAUR PROCESSING FACILITY (CPF)

(AIR FORCE) (CCAFS)

This facility supports the mission model for the Titan/Centaur upper stage program. The facilities will be constructed in two phases. Phase I is the Cryogenic Tanking Facility, scheduled for completion in June 94. Phase II is the Centaur Processing Building scheduled to begin construction in late 1994, with completion in mid-1996. This facility is rated for an explosive rating of 1.3 with a Quantity-Distance (Q-D) radius of 3000 feet due to the capability to tank the upper stage with cryogenic fuels. It is comprised of three separate buildings: the Centaur Tanking Facility...used to remotely fuel the Centaur; the Centaur Processing Building...used to store/test (four cells) and process the Centaur; and an administrative building housing the personnel working at the site. Once completed this facility will be the only one with the capability of providing remote cryogenic tanking away from the launch complex for the centaur upper stage. It will also provide clean room storage capability for the Centaur, and off-the-complex electrical/mechanical checkout once Vertical Integration Building (VIB) Cell 3 is deactivated.

The initial buildup and checkout of the Centaur upper stage is currently performed in VIB cell 3. This cell is no longer economical to maintain/repair. Cell 3 is constructed from structural steel members which are now starting to sag due to fatigue from the repeated erecting and de-erecting of the Centaur. There are already noticeable gaps between the door closures and the structure of cell 3. Reinforcing structural members have been added as required but continued patching is no longer advisable. Cell 3 does not have the capability for any pressure checks or cryogenic loading of the Centaur; this dangerous and time consuming activity must currently be performed on the launch pad. This activity prevents any other activities from occurring on the pad at the same time. Once the CPF is constructed the launch pad will no longer need to be used for cryogenic loading thereby freeing up the pad for other activities.

There are 76 Titan/Centaur missions included in the mission model (1993-2023).

The $128M consists of approximately $48M programmed for facility construction ($14.6M for Phase I, $33M for Phase II) and $80M for equipment/technical support costs.

See Figure PPLR-14.

FILE: CPF1

CONSTRUCT CENTAUR PROCESSING FACILITY (CPF)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility will be constructed under the military construction (MILCON) program to replace the existing Vertical Integration Building Cell 3 for storage and processing of Centaur upper stages. The CPF will also perform cryogenic tanking of the centaur which is now performed at the pad.

PAYOFF POTENTIAL: - Improve operations efficiency.

COST SUMMARY: - Implementation cost: $128M.

PROS:
- Enhances critical capability for the Centaur program.
- Decreases pad serial flow time.

CONS:
- Initial investment.

STEPS TO MAKE IT HAPPEN: - 45 SPW continue MILCON project to construct the CPF.

TASK GROUP RECOMMENDATION: Continue MILCON project by 45 SPW to construct the CPF.

DATE: 12/06/93 **REV:**1/13/94 **CAT:** 1A

FILE: CPF

CONSTRUCT DELTA LAUNCH OPERATIONS FACILITY

(AIR FORCE) (CCAFS)

This facility is required to relocate personnel who are currently at risk during hazardous operations at space launch complex (SLC) 17. These personnel are currently housed in the SLC 17 blockhouse. The blockhouse is a semi-hardened and environmentally controlled structure that houses all command, control, and monitoring equipment for the Delta II during assembly, checkout, and launch at the launch pad. This includes control consoles, communication consoles, and a telemetry laboratory. It protects critical equipment and personnel from launch debris and other hazards such as ordnance detonations, fires, high pressure vessel bursts, cryogenic liquids, and toxic vapors. It serves as operations control for two different launch pads (SLC 17A&B) during day-to-day operations.

The primary threat to personnel located in the blockhouse during hazardous operations is associated with the strap on solid rocket motors used on the Delta launch vehicles. These SRMs have been upgraded from the previously used Castor IV motors to the Graphite Epoxy Motors (GEMs). The GEMs present a greater explosive threat to the blockhouse structure that endangers the people inside. The launch control function is therefore being relocated to a new facility to be constructed under an FY 95 MILCON and the blockhouse capabilities will be downgraded to those of a communications node/equipment staging area. This MILCON was already in work to house the Delta administrative function. The launch control function was then added to this existing MILCON project design and will be housed on the 2nd floor. This new facility will be located across the street (due west) from the Range Operations Control Center ROCC).

The 2.9M implementation cost represents facility costs to add a 2nd story to the Delta Launch Operations Facility. Equipment costs to replace the SLC 17 blockhouse function are currently TBD.

A separate option chart entitled "Relocate the Capabilities of the SLC-17 Blockhouse" addresses the O&M cost savings associated with reducing the SLC 17 blockhouse from a launch control center to a communications node.

See Figure PPLR-15

FILE: DLOF1

CONSTRUCT DELTA LAUNCH OPERATIONS FACILITY

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is not yet constructed but is required to support the mission model for the Delta launch program. The Delta launch operations control function is currently being performed in the space launch complex (SLC) 17 blockhouse. Personnel in the blockhouse are currently at risk during hazardous operations and need to be relocated away from the hazardous operations performed at the SLC. The current plan is to house this function in a new facility to be constructed under an FY 95 MILCON.

PAYOFF POTENTIAL: - Eliminate safety constraint.

COST SUMMARY: - Implementation cost: $2.9M.

PROS:
- Correct safety deficiency.
- Consolidate launch operations function with Delta administrative function.

CONS: - Initial capital investment.

STEPS TO MAKE IT HAPPEN: - 45 SPW continue with FY 95 MILCON.

TASK GROUP RECOMMENDATION: Continue with on-going FY95 MILCON Project for 45 SPW to construct new facility.

DATE:11/18/93 REV:1/13/94 CAT:1A

FILE: DLOF

REALIGN PAYLOAD ASSEMBLY & CHECKOUT BLDG/V-25, PAYLOAD ASSEMBLY & CHECKOUT BLDG/V-26, AND NAVAL SURFACE WEAPONS CENTER/LAND BASED COMBAT SYSTEMS LAB & PERFORMANCE TEST FACILITY/Z-41

(NASA/DOD) WALLOPS FLIGHT FACILITY (WFF)

Buildings V-25 and V-26 will become a joint NASA/Navy project facility. A new DoD MILCON project, to support the Navy weapons program currently housed in Z-41, will be constructed just to the north of V-25 and V-26. Building Z-41 would become available for Commercial launch vehicle assembly to support the national "Mission Model."

Currently, V-25 and V-26 are used for the assembly of payloads launched on the WFF Test Range. These facilities would change from payload assembly and checkout building to a joint use NASA/Navy project facility. Z-41 currently supports a Navy weapons program. Since 1980, the Navy (Naval Surface Warfare Center, Dahlgren Division) has had a Use Permit for Building Z-41 and has conducted a number of combat system element level tests and experiments there. Currently Building Z-41 continues to support Navy combat system level or element level engineering and testing functions. Long range NASA master planning has designated the Central and Southern portions of the Island (between Pad 0 and Pad 5) as the Wallops Flight Facility (WFF) Active Launch Range. Safety criteria do not allow certain "incompatible" activities in this area and necessitates operational constraints on the Navy's use of Building Z-41. These constraints include close daily control of all radiation-emitting instrumentation along with restrictions on vehicle traffic and personnel access. The Conestoga Launch Pad is located approximately 500 feet from Z-41 and the 50,000 lb. capable launcher on Pad 1 is located approximately 1,000 feet from Z-41. Some launch vehicle checkout procedures and all launch operations from both of these pads will require evacuation of Z-41. Because of possible RF generated actuation of pyrotechnic devices and possible RF damage to sensitive electronic circuits in the launch vehicle/payload system, radiation from the many Navy radiators in Z-41 will be greatly restricted while vehicles are on these pads. In the past V-25 and V-26 were final payload assembly checkout facilities.

See Figures PPLR-16 and PPLR-17.

REALIGN PAYLOAD ASSEMBLY & CHECKOUT BLDG/V-25, PAYLOAD ASSEMBLY & CHECKOUT BLDG/V-26, AND NAVAL SURFACE WARFARE CENTER/LAND BASED COMBAT SYSTEMS LAB AND PERFORMANCE TEST FACILITY/Z-41

(NASA/DOD) WALLOPS FLIGHT FACILITY (WFF)

DESCRIPTION: Buildings V-25 and V-26 will become a joint NASA/Navy project facility. A new DoD MILCON project, to support the Navy weapons program currently housed in Z-41, will be constructed just to the north of V-25 and V-26. Building Z-41 would become available for Commercial launch vehicle assembly to support the national "Mission Model." Currently, V-25 and V-26 are used for the assembly of payloads launched on the WFF Test Range. Z-41 currently supports a Navy weapons program.

PAY OFF POTENTIAL:
- Eliminate safety constraints.
- Increased operational efficiency.

COST SUMMARY:
- Implementation costs: None to NASA.
  $10M to Navy for new MILCON.
- Anticipated net savings: $75K/Yr

PROS:
- Separation of incompatible activities.
- Assembly shop available for Commercial users.
- Decreased interruption of Navy activities.

CONS :
- None identified

STEPS TO MAKE IT HAPPEN:
- DOD/NAVSEA-06 obtain funds to build new MILCON.
- NASA/WFF to take custody of Z-41 when Navy/DoD vacates to support commercial missions in the national "Mission Model."

TASK GROUP RECOMMENDATION: NASA/WFF and DoD/Navy realign facilities and DoD/NAVSEA-06, proceed with funded new MILCON to support future approved DoD weapons program.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

MODIFY PAYLOAD PROCESSING FACILITY/M-16
(NASA/DOT) WALLOPS FLIGHT FACILITY (WFF)

This facility will be modified to support the NASA Small Expendable Launch Vehicle Services (SELVS) (Pegasus) Program from WFF; it will be used to house SELVS payload final integration and checkout at WFF. The remainder of the building will continue to be used for the receipt, inspection, and storage of inert sounding rocket hardware. The facility is required to support both the NASA Suborbital Science Program and the SELVS Program (one Pegasus SELVS mission per year for foreseeable future and in some out years, 2/yr) as identified in the national "Mission Model."

Building M-16 is located in the rocket motor storage area on the Main Base. This building has been the primary storage area for sounding rocket inert hardware. Approximately 3,700 sq. ft of this 19,000 sq. ft building will be modified to serve as the SELVS payload final integration and checkout facility. A contract for $695K was awarded in December 1993 to start the modification. This facility was chosen as the SELVS Payload Processing Facility because it is located near (approx. 1500 feet) the SELVS Vehicle Assembly Building (M-20).

The only current Payload Processing Facility on the WFF Main Base is the Sounding Rocket Fabrication and Integration Facility (F-10). The F-10 Facility supports approximately 30 sounding rocket payloads per year. Because of this large number of sounding rocket payloads supported, F-10 does not have the capacity to support the SELVS payloads. F-10 was designed for fabrication and integration of the smaller sounding rocket payloads and is not compatible with the SELVS payloads.

M-16 will also continue as the primary sounding rocket inert storage area, however, 3,800 sq. ft of M-20 will be converted from rocket motor storage to inert hardware storage.

See Figure PPLR-18.

MODIFY PAYLOAD PROCESSING FACILITY/M-16
(NASA/DOT) WALLOPS FLIGHT FACILITY (WFF)

DESCRIPTION: This facility will be modified to support the NASA Small Expendable Launch Vehicle Services (SELVS) (Pegasus) Program from WFF; it will be used to house SELVS payload final integration and checkout at WFF. The remainder of the building will continue to be used for the receipt, inspection, and storage of inert sounding rocket hardware. The facility is required to support the SELVS and NASA Suborbital Science Programs as identified in the national "Mission Model."

PAYOFF POTENTIAL: - Ability to meet mission model.

COST SUMMARY:
- Implementation costs: $695K.
- O&M costs: $51K.
- Anticipated net savings: none (cost avoidance - using existing facility).

PROS:
- Required to support one Pegasus/SELVS mission per year for foreseeable future as identified in the national "Mission Model" (some out years: 2/yr).
- Upgrade of existing structure.
- Dual use of existing structure.
- Direct access to WFF Research Airport.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - NASA/WFF to fund current $695K request in FY94 and modify facility.

TASK GROUP RECOMMENDATION: NASA/WFF proceed with modification.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

CONSTRUCT ROCKET ASSEMBLY BUILDING "C"
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA) (ALASKA)

This facility is currently under design at PFRR to support the NASA Suborbital Science program as identified in the national "Mission Model." A construction contract costing $894K was awarded in FY93 by NASA/WFF to the University of Alaska for this new building.

It will be a new 2,351 sq. ft. rocket assembly building with a 60-ft. by 30-ft. rocket assembly bay with bridge crane and mechanical room. This recommendation will eliminate the safety waiver required for assembly of rocket motor systems in rocket motor storage area and provide additional assembly space.

Recommend University of Alaska/PFRR complete construction by the end of FY94 to meet the requirements of the national "Mission Model."

CONSTRUCT ROCKET ASSEMBLY BUILDING "C"
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA) (ALASKA)

DESCRIPTION: This facility is currently under design at PFRR to support the NASA Suborbital Science program as identified in the national "Mission Model." It will be a new 2,351 sq. ft. rocket assembly building with a 60-ft. by 30-ft. rocket assembly bay with bridge crane and mechanical room. This recommendation will eliminate a safety waiver required for assembly of rocket motor systems in motor storage area.

PAYOFF POTENTIAL: - Eliminate safety constraint.

COST SUMMARY: - Implementation cost: $894K.

PROS: - Eliminates safety waiver.
- Provides additional assembly space.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - NASA/WFF and PFRR to complete design and proceed with construction.

TASK GROUP RECOMMENDATION: PFRR to complete construction of new facility by end of FY94.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

CONSTRUCT NEW SCIENCE OPERATIONS CENTER (SOC)
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA) (ALASKA)

An existing condemned Optical Observatory facility will be abandoned; the new Science Operations Center (SOC) will replace the Optical Observatory. The Optical Observatory is a wooden structure housing the science personnel and instrumentation necessary to launch rockets into the correct aurora conditions at PFRR. The facility supports the NASA Suborbital Science Program as identified in the national "Mission Model."

The Science Operations Center will contain sensitive camera equipment systems which must be separated from all artificial light sources. These camera systems are used to investigate the auroral conditions found at this high latitude. The operation of other co-located PFRR activities are incompatible with this science requirement.

A grant for the new Science Operations Center was awarded by NASA/HQ Grants Office to the University of Alaska on April 1, 1993.

Recommend University of Alaska/PFRR complete construction of new facility by end of FY95 to meet the requirements of the national "Mission Model."

CONSTRUCT NEW SCIENCE OPERATIONS CENTER (SOC)
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA) (ALASKA)

DESCRIPTION: The condemned Optical Observatory will be abandoned; the new Science Operations Center (SOC) will replace the Optical Observatory. The Optical Observatory is a wooden structure housing the science personnel and instrumentation necessary to launch rockets into the correct auroral conditions at PFRR. The facility supports the NASA Suborbital Science Program as identified in the national "Mission Model."

PAYOFF POTENTIAL: - Operational efficiency.

COST SUMMARY: - Implementation cost: $3.3M.

PROS:
- Replaces condemned wooden structure.
- Stand-alone science facility.

CONS:
- None identified.

STEPS TO MAKE IT HAPPEN: - A grant for the facility was awarded by NASA/HQ Grants Office to the University of Alaska on April 1, 1993.

TASK GROUP RECOMMENDATION: PFRR to complete construction of new facility by end of FY95.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

UPGRADE LAUNCH AREA 3
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA)(ALASKA)

The Pad 3 launcher will be upgraded with construction of an environmental shelter in FY93 for a $1M construction cost. This pad is required to launch rockets into the correct auroral conditions at this high latitude. Currently, there is not a shelter on this pad. The facility upgrade is currently in the design phase. The facility supports the NASA Suborbital Science Program as identified in the national "Mission Model."

The new Shelter will provide protection of the rocket vehicle/payload/personnel from extreme cold winter conditions (0 to minus 60 degrees F) and increase efficiency and safety of launch pad operations. A contract was awarded by NASA/WFF to University of Alaska in FY93 for this construction.

Recommend University of Alaska/PFRR complete construction of new facility by end of FY94 to meet the requirements of the national "Mission Model.

See Figure PPLR-19.

UPGRADE LAUNCH AREA 3
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA)(ALASKA)

DESCRIPTION: The Pad 3 launcher will be upgraded with construction of an environmental shelter in FY93. This pad is required to launch rockets into the correct auroral conditions at this high latitude. There is no shelter for environmental requirements. Currently (11/93), the facility upgrade is in the design phase. The facility supports the NASA Suborbital Science Program as identified in the national "Mission Model."

PAY OFF POTENTIAL:
- Less risk to launch vehicles.
- Increased efficiency.

COST SUMMARY: - Implementation cost: $1M.

PROS:
- Shelter will provide protection of the rocket vehicle/payload/personnel from extreme cold winter conditions (0 to minus 60 degrees F).
- Increase efficiency and safety of launch pad operations.

CONS:
- None identified.

STEPS TO MAKE IT HAPPEN:
- NASA/WFF and PFRR to proceed with funded upgrade.
- A contract was awarded by NASA/WFF to University of Alaska in FY93 for this construction.

TASK GROUP RECOMMENDATION: PFRR to complete construction of new facility by end of FY94.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

CONSTRUCT TELEMETRY FACILITY
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA)(ALASKA)

A new building will be constructed; it will be a permanent facility to house existing telemetry receiving and data display systems. The existing 55-ft. diameter geodesic dome will continue to house the telemetry antennas. The new facility will support the NASA Suborbital Science Program; it will also provide space for the new satellite ground station electronics required to support the Fast Auroral Snapshot Explorer (FAST) satellite mission. Both programs are identified in the national "Mission Model."

The rational for separating different PFRR activities follow:

1) The new Science Operations Center (SOC) will contain sensitive camera equipment systems which must be separated from artificial light sources; these camera systems are used to investigate the auroral conditions found at this high latitude in meeting the national "Mission Model." 2) The operations of other co-located PFRR activities that are equipped with exterior lighting systems are incompatible with this science requirement. 3) The operation of the PFRR telemetry site requires lights for system repair, maintenance, and safety. 4) The existing telemetry site does not have the necessary physical space for locating the SOC without major excavation of the site. 5) The cost of moving the existing telemetry antenna equipment to the proposed SOC site would exceed the cost ($1.2M) of the new building space to house the telemetry receiving and display systems. 6) Consolidating this new facility with other new construction at PFRR would still require the same amount of floor space to support different operations, therefore any savings would be negligible.

A contract was awarded by NASA/WFF to University of Alaska in FY93 for this construction.

Recommend University of Alaska/PFRR complete construction of new facility by end of FY94 to meet the requirements of the national "Mission Model."

CONSTRUCT TELEMETRY FACILITY
POKER FLAT RESEARCH RANGE (PFRR)
(AIR FORCE/NASA)(ALASKA)

DESCRIPTION: A new building will be constructed; it will be a permanent facility to house existing telemetry receiving and data display systems. The existing 55-ft. diameter geodesic dome will continue to house the PFRR telemetry antennas. The primary reason the new building must be separate from the Science Operations Center (SOC) is because telemetry equipment requires exterior lighting for repair, maintenance, and safety which is incompatible with the SOC light sensitive optical instrument operating requirements . This facility will support the NASA Suborbital Science Program; it will also provide space for the new satellite ground station electronics required to support the Fast Auroral Snapshot Explorer (FAST) satellite mission. Both programs are identified in the national "Mission Model."

PAYOFF POTENTIAL: - Increased operational efficiency.

COST SUMMARY: - Implementation cost: $1.2M.

PROS:
- Permanent facility.
- Provide the space for a Fast Auroral Snapshot Explorer (FAST) satellite mission ground station.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN:
- NASA/WFF and PFRR to proceed with construction of new building.
- a contract was awarded by NASA/WFF to University of Alaska in FY93 for this construction.

TASK GROUP RECOMMENDATION: PFRR to complete construction of new facility by end of FY94.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

UPGRADE VEHICLE ASSEMBLY BUILDING (VAB) LC-36
WHITE SANDS MISSILE RANGE (WSMR)
(NASA)(NEW MEXICO)

This facility supports the NASA Sounding Rocket Program launches at the White Sands Missile Range, NM as identified in the national "Mission Model." This vehicle assembly building will be upgraded for a fire protection system (80%) and an upgrade of the Attitude Control Systems Lab (20%). Implementation costs for upgrade is $330K.

The facility is used to perform vibration, mass properties, bend testing, spin balance, weight and center of gravities (CG's) for sounding rocket payloads. It is also used as a payload integration facility where all electrical and mechanical testing is performed prior to launch. The building also houses a vehicle support lab and telemetry ground station.

See Figure PPLR-20.

UPGRADE VEHICLE ASSEMBLY BUILDING (VAB) LC-36
WHITE SANDS MISSILE RANGE (WSMR)
(NASA)(NEW MEXICO)

DESCRIPTION: This facility will be upgraded for a fire protection system (80%) and an upgrade of the Attitude Control Systems Lab (20%). This facility supports the NASA Sounding Rocket Program launches at the White Sands Missile Range, NM. It is used to perform vibration, mass properties, bend testing, spin balance, weight and center of gravities (CG's) for sounding rocket payloads. It is also used as a payload integration facility where all electrical and mechanical testing is performed prior to launch. The building also houses a vehicle support lab and telemetry ground station. The facility supports the NASA Suborbital Science Program as identified in the national "Mission Model."

PAYOFF POTENTIAL: - Facility complies with safety codes.

COST SUMMARY: - Implementation costs: $330K.

PROS: - Compliance with safety codes.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - NASA/WFF to proceed with contract award.

TASK GROUP RECOMMENDATION: NASA/WFF to proceed with contract award to comply with safety codes.

DATE: 1/13/94 **REV:** 1/13/94 **CAT:** 1A

TRANSFER THE ASRM KNEEL DOWN TRANSPORTER TO THE SPACE STATION PROGRAM
(NASA) (MSFC)

The ASRM transporters are self-propelled, elevating-bed vehicles, 66 feet long, 20 feet wide, and a variable bed height of 3 feet 11 inches to 5 feet 11 inches. Each is powered by a diesel engine which drives hydraulic pumps that furnish hydraulic fluid to propel, steer, and elevate the vehicle. The transporters can carry up to a 795,000-pound distributed load on paved roads with grades up to 5 percent. Each transporter weighs approximately 200,000 pounds, has 96 wheels, and has a load distribution system to make it compatible with a type H-20 roadway.

MSFC has transferred the ASRM Kneel Down Transporters to the Space Station GSE Inventory and is planning to ship these from the MICHOUD facility to MSFC. The transporters will be used to move the payload shipping container (Hubble) (Item #19 - CAT 1B) with or without Space Station payloads at MSFC.

The payload shipping container (Hubble) is already located at MSFC for use in the Space Station and/or other programs.

See Figure PPLR-73.

TRANSFER THE ASRM KNEEL DOWN TRANSPORTER TO THE SPACE STATION PROGRAM
(NASA) (MSFC)

DESCRIPTION: The ASRM Kneel Down Transporters (2 ea) are presently being stored at the Michoud facility. The ASRM program has been cancelled. These transporters are planned to be used for and have been transferred to the Space Station Program in support of the STS mission model. The Transporters are to be used to transport the payload shipping container at MSFC. Previous program plans were to lease commercial moving equipment on an as-required basis.

PAYOFF POTENTIAL: - Potential cost savings of $50K to $100K per year over the use of commercial equipment.

COST SUMMARY:
- Implementation cost: None.
- O&M cost: $50 K/Yr.
- Anticipated savings: $50K/Yr.

PROS:
- Eliminates costly rental of commercial movers.
- Transporters are new and belong to MSFC.

CONS: - None.

STEPS TO MAKE IT HAPPEN: - None. MSFC has transferred the transporters to the Space Station Program.

TASK GROUP RECOMMENDATION: Code M continue with the planned use of these transporters for moving the payload shipping container/Space Station payloads at MSFC.

DATE: 11/18/93 **REV:** 2/24/94 **CAT:** 1A

DOWNMODE USE OF WHITE SANDS SPACE HARBOR
NORTHRUP STRIP, N.M.
(NASA/DOD) (WSSH)

WSSH consists of multiple gypsum/dry lake bed runways 05/23 and 17/35, each being 15,000 feet long by 300 feet wide with 1,000-foot overruns. WSSH is equipped with NAV/landing aids - TACAN-MSBLS aim point PAPI lites-ball/bar and distance to go markers. Ground and ground to air communication is available. Fire and crash and rescue and medical support is provided prior to landing. WSSH also serves as an abort-once-around (AOA) and emergency landing site (ELS) for the Shuttle. Additionally, R/W 02 (11,800 feet long by 156 feet wide) is used for ELS training and R/W 20 (also 11,800 feet long by 156 feet wide) is used for transatlantic landing (TAL) training.

Only one Orbiter landing was made at WSSH and strong winds caused severe sand (gypsum) intrusion into Orbiter engine areas and thruster components. The total cost estimate for repair of this damage has not been identified at this time as the records have been archived.

Downmode of WSSH for Orbiter landings would not impact ELS or TAL training, which is funded by JSC at approximately $1.9 M/year for Shuttle training. This funding includes O&M of the landing/Nav Aids and runways. Downmode would reduce and/or eliminate approximately $1.1 M/year for Range launch and landing support (communications and tracking and DDMS and weather) funded by KSC. Additional funding of approximately $350 K/year is provided by KSC through JSC Code GF for miscellaneous support. This could also be reduced or eliminated. Also, the predeployed KSC ground team could be reduced/eliminated at an additional savings of approximately $50 K/year.

DOWNMODE USE OF WHITE SANDS SPACE HARBOR NORTHRUP STRIP, N.M.
(NASA/DOD) (WSSH)

DESCRIPTION: WSSH is one of two CONUS dry lake bed runways equipped with all landing/NAV aids required for an Orbiter end-of-mission (EOM) landing. It is also equipped with some post-landing safing equipment. WSSH also serves as an abort-once-around (AOA) and emergency landing site (ELS). This recommendation is to not use WSSH for an Orbiter landing except where no other choice exists (May-Day). This downmode is due to severe Orbiter contamination/damage by fine sand particles and the high cost of refurbishment.

PAYOFF POTENTIAL:
- Cost savings to the STS program.
- Reduce risk of severe damage to the Orbiter.

COST SUMMARY:
- Total cost for WSSH: $3.4M/Yr
- Cost to continue use as a training site: $1.9M/Yr
- Cost savings to discontinue use as landing site: $1.1 - 1.5 M/Yr (actual cost savings)

PROS:
- Avoids potential Orbiter damage
- Other AOA and ELS sites available

CONS:
- None.

STEPS TO MAKE IT HAPPEN:
- JSC to develop program to downmode.
- JSC Code GF to issue Change Request (CR) to 07700 Document.

TASK GROUP RECOMMENDATION: Code M to downmode Northrup Strip as an Orbiter landing site.

DATE: 11/18/93 **REV:** 04/06/94 **CAT:** 1A

CANCEL PROPOSED NEW EARTH OBSERVING SYSTEM (EOS) PROCESSING FACILITY AT VAFB AND USE EXISTING FACILITY
(AIR FORCE/NASA) (VAFB)

The EOS Program requires a Payload Processing Facility at VAFB to process EOS payloads prior to launch. The first EOS launch is planned for June 1998 based on the mission model. The facility will be used for prelaunch checkout, fueling and fairing encapsulation prior to erection on the launch vehicle. The present baseline EOS facility requirements specify a 7,900-square-foot hazardous processing facility with a 25-foot by 50-foot door and a 30-ton crane with a 60-foot hook height. The door size, crane capacity, and hook height are dictated by the nose fairing and shipping container sizes.

There are subsequent studies in work to downsize the present EOS configuration to fly on a smaller booster vehicle. The outcome of these studies may result in reduced requirements for EOS processing.

Since the existing NASA payload facilities at VAFB are inadequate for the present EOS processing requirements, the following options were reviewed:

- Build a new facility (three sites investigated)
- Utilize the SLC-6 Payload Preparation Room (PPR) (building layout is inadequate for optimum processing)
- Modify existing NASA facility (Building 1610)
- Modify existing AF facility (Building 1900)

After completion of a facility concept study by KSC/DE, the National Facilities Study team identified a classified AF payload processing facility which is also adequate for EOS processing. Since many VAFB facilities appear to be adequate to process the baseline EOS or any smaller configuration, the KSC/DE efforts to provide a new payload facility are being discontinued and NASA Headquarters Code Y is working on an agreement with the AF for shared use of an existing AF facility. NASA Headquarters is also assessing the viability of commercial facility options that may be available in 1998.

CANCEL PROPOSED NEW EARTH OBSERVING SYSTEM (EOS) PROCESSING FACILITY AT VAFB AND USE EXISTING FACILITY
(AIR FORCE/NASA) (VAFB)

DESCRIPTION: Since the existing NASA spacecraft facilities at VAFB are inadequate for the baseline EOS processing, a number of options were reviewed. These options included building a new facility, using PPR at SLC-6, modification of the NASA Hazardous Processing Facility/Building 1610, and modification of an existing AF facility/Building 1900. The NFS team also identified a classified AF processing facility adequate for EOS processing. Agreement between NASA/AF for shared use of this facility is being worked. NASA is also assessing the viability of commercial facility options that may be available in 1998. Use of an existing facility would eliminate the need to build a new facility.

PAYOFF POTENTIAL: - Cost savings to the EOS program.

COST SUMMARY:
- Approximately $15M cost avoidance for new facility construction.
- Reduced O&M costs for shared facility.

PROS: - EOS program cost saving.

CONS: - Use of a shared facility may be necessary and could cause scheduling conflicts.

STEPS TO MAKE IT HAPPEN:
- Cancel KSC/DE EOS facility design efforts and remove from CofF budget.
- NASA Headquarters Code S coordinate joint use of existing USAF facility and continue to assess the viability of commercial facility options that may be available in 1998.

TASK GROUP RECOMMENDATION: Code S to cancel proposed construction of new facility and use an existing AF facility for EOS processing.

DATE: 11/18/93 **REV:** 04/05/94 **CAT:** 1A

EXCESS THE KSC HELICOPTER FLEET
(NASA) (KSC)

NASA/KSC maintains a fleet of four UH-1 "Huey" helicopters at PAFB. They are used to support medical emergencies, security operations, launch activities, and other Center needs. They serve as television camera platforms during each launch. These aircraft can be configured for a variety of purposes and many specialized missions. The helo fleet consists of three units built in 1965 and one built in 1964. They have all been bought off Government excess, refurbished, and put into service. The original mission for these helos was to provide Mode VII and VIII rescue capability for the STS launch and landing operations. This mission is now being performed by the DOD. The pilots and maintenance mechanics are all civil service personnel who also operate and maintain the KSC administrative aircraft, a G-1 Gulfstream Prop-Jet-type aircraft.

In FY 93, the helo fleet logged a total of 283 flight hours. Cost to provide this service was a total of $290,000. The breakdown is as follows: Civil service operation and maintenance costs were $136,000, material and other direct costs were $131,000, fuel cost was $15,000, and training and certification costs were $8,000. Since the original STS mission is now being performed by the DOD, it is felt that any additional STS support required could also be supplied in the same manner, on a reimbursable basis. Any additional requirements which KSC might have could be supported by leasing services from private aviation sources, either helos or fixed-wing aircraft. It is believed that the net cost to the Government would be significantly less using this approach.

See Figure PPLR-76.

EXCESS THE KSC HELICOPTER FLEET
(NASA) (KSC)

DESCRIPTION: KSC operates a fleet of 4 UH-1 helicopters. Three of them were built in 1965 and one in 1964. The pilots and mechanics are all civil service (NASA). Originally procured for Mode VII and VIII STS rescue; however, there is no longer a requirement for use since this capability is provided by the Air Force.

PAYOFF POTENTIAL: - Cost savings to the STS program.

COST SUMMARY:
- Implementation costs: None.
- O&M costs: $290K/Yr.
- Anticipated savings: $290K/Yr.

PROS:
- Eliminates significant costs.
- DOD capability presently provides and meets STS support requirements.

CONS: - None Identified.

STEPS TO MAKE IT HAPPEN:
- GSA to excess existing helicopter fleet and spares.
- KSC to downsize maintenance and operations manpower accordingly.

TASK GROUP RECOMMENDATION: Code M to excess the helicopter fleet at KSC and reduce recurring O&M costs.

DATE: 11/18/93 **REV:** 03/30/94 **CAT:** 1A

FIND USE FOR OR SURPLUS THE CURRENTLY INACTIVE HYPERGOLIC STORAGE FACILITY (HSF)

(AIR FORCE) (CCAFS)

This facility is not required to support the mission model and is currently in a mothballed state. $2,500/Yr is spent to maintain a nitrogen purge on the tanks and the associated electronic controls to prevent corrosion which would render these assets useless for future use. This facility has ten 28,000-gallon tanks capable of storing fuels or other liquid commodities. Although originally designed to store hypergolic fuels, an Environmental Impact Statement may be required if this were to be activated as a hypergolic fuel storage facility. Hypergolic fuels are presently stored in truck tankers, rail cars (for Titan only), and mobile equipment (e.g., drums, movable tanks).

If no use can be found for this facility, then action will be taken to surplus the HSF in order to save $2,500/Yr in caretaker O&M costs. Any action to declare the HSF as surplus will contain the restriction that this facility cannot be used to store hypergolic fuels.

See Figure PPLR-84.

FIND USE FOR OR SURPLUS THE CURRENTLY INACTIVE HYPERGOLIC STORAGE FACILITY (HSF)
(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is currently in a mothballed state and is not required to support the mission model. This facility was originally constructed by HQ AFLC (now Material Command) for the purpose of stockpiling hypergolic fuels. This requirement no longer exists. A study is under way to consider alternative uses for this facility. If no other uses can be found, then action will be taken to declare this facility as surplus.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:
- Implementation cost: None
- O&M costs: $2,500/Yr.
- Anticipated net savings: $2,500/Yr.

PROS: - Utilize underused resource.

CONS: - None.

STEPS TO MAKE IT HAPPEN:
- 45 SPW continue study to identify potential uses by 4 April 1994 for the HSF.
- 45 SPW to match potential use with current operational requirement by 5 July 1994.
- 45 SPW to initiate new use of the HSF or start action to surplus by 19 July 1994.

TASK GROUP RECOMMENDATION: Continue study by 45 SPW to find a use for the HSF or surplus the facility.

DATE: 12/06/93 **REV:** 04/06/94 **CAT:** 1A

P1/WP51/STENIS-2.1A

EXCESS THE ORBITER PROTECTIVE ENCLOSURE (OPE)
(NASA) (KSC)

The Orbiter Protective Enclosure is a metal truss, fabric-covered structure 250 feet long, 160 feet wide, and 90 feet tall with lighting, ventilation fans, convenience power, and a motorized door. The OPE was designed to accommodate an orbiter, payload container, and container trailer for use at a contingency landing site (CLS) for DoD payloads that require removal prior to the return of the Orbiter. The structure has never been fully assembled and is presently being stored. Offsite commercial storage of 1,000 square feet has been leased since January 1989 at a cost of $15K/Yr. The trusses have been stored onsite at KSC outdoors exposed to the environment.

The original cost of the OPE, including design, fabrication, and transportation to KSC, was $1.24M. Due to the potential environmental damage of the outdoor stored structures and transportation costs, the salvage value is estimated at $200K to $300K. There is no known use for this structure at KSC as it is not designed for hurricane-force winds.

EXCESS THE ORBITER PROTECTIVE ENCLOSURE (OPE)
(NASA) (KSC)

DESCRIPTION: The Orbiter Protective Enclosure (OPE) is presently being stored with some parts onsite and other parts in offsite commercial storage. The OPE was designed and fabricated for use at a contingency landing site (CLS) to accommodate the orbiter and the removal of a DoD payload. There are presently no more DoD payloads on the manifest.

PAYOFF POTENTIAL: - Potential cost savings of $15K/Yr. + investment return of $200K - $300K.

COST SUMMARY:
- Implementation cost: None.
- Commercial storage cost: $15K/Yr.
- Salvage value: $200K - $300K.
- Anticipated savings: $215K - $315K.

PROS:
- Eliminates costly rental of commercial storage.
- Salvage (excess) value is diminishing due to onsite outdoor storage of truss parts.
- No known future use.

CONS: - None.

STEPS TO MAKE IT HAPPEN: - KSC (TE-FAC) excess the OPE.

TASK GROUP RECOMMENDATION: Code M to excess the Orbiter Protective Enclosure.

DATE: 03/30/94 **REV:** **CAT:** 1A

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY

WORKING GROUP

CAT 1A

FACILITY PHOTOGRAPHS

C-2.

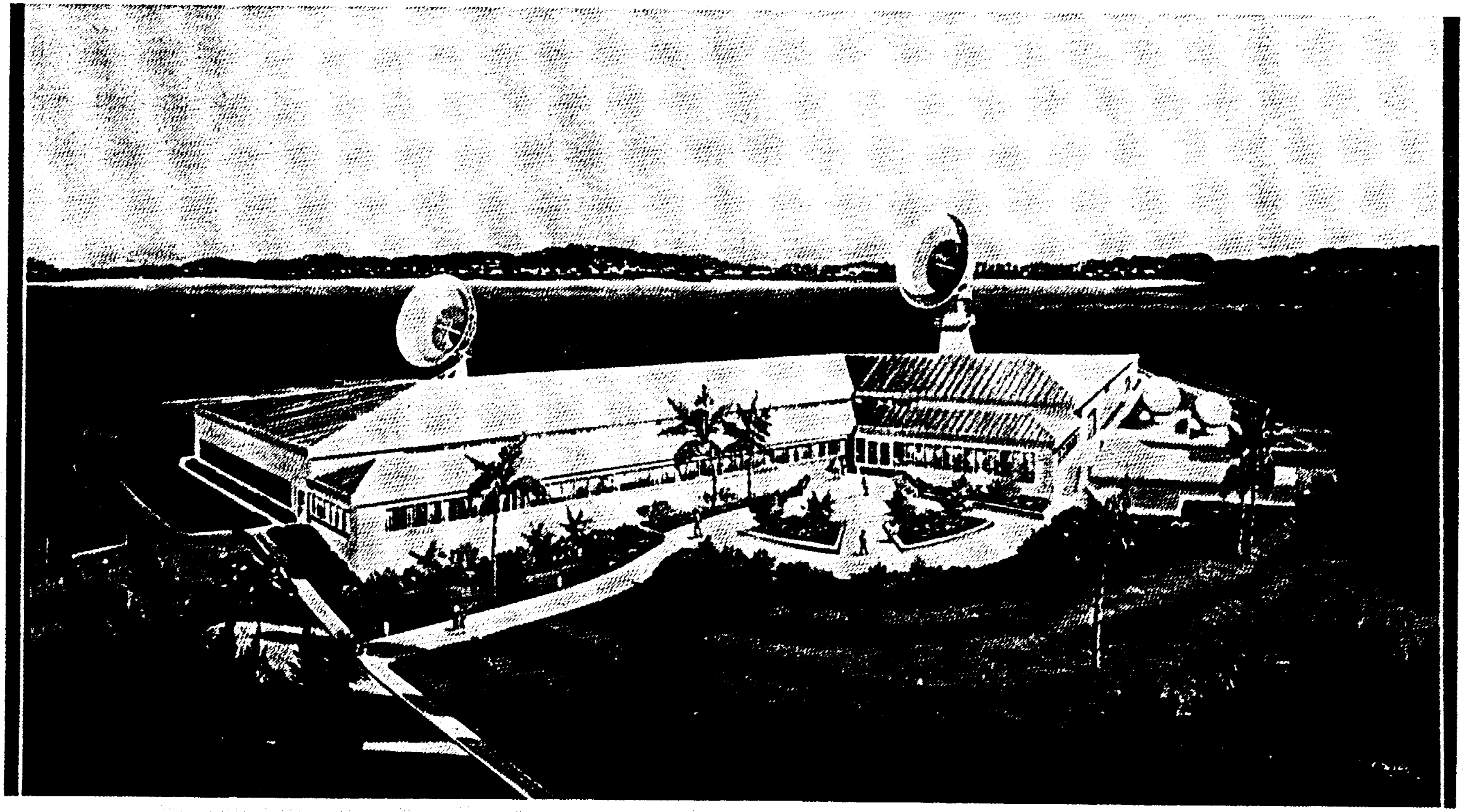


Figure PPLR-1.

Artist Concept Typical Range Standardization
and Automation Facility (RSA)

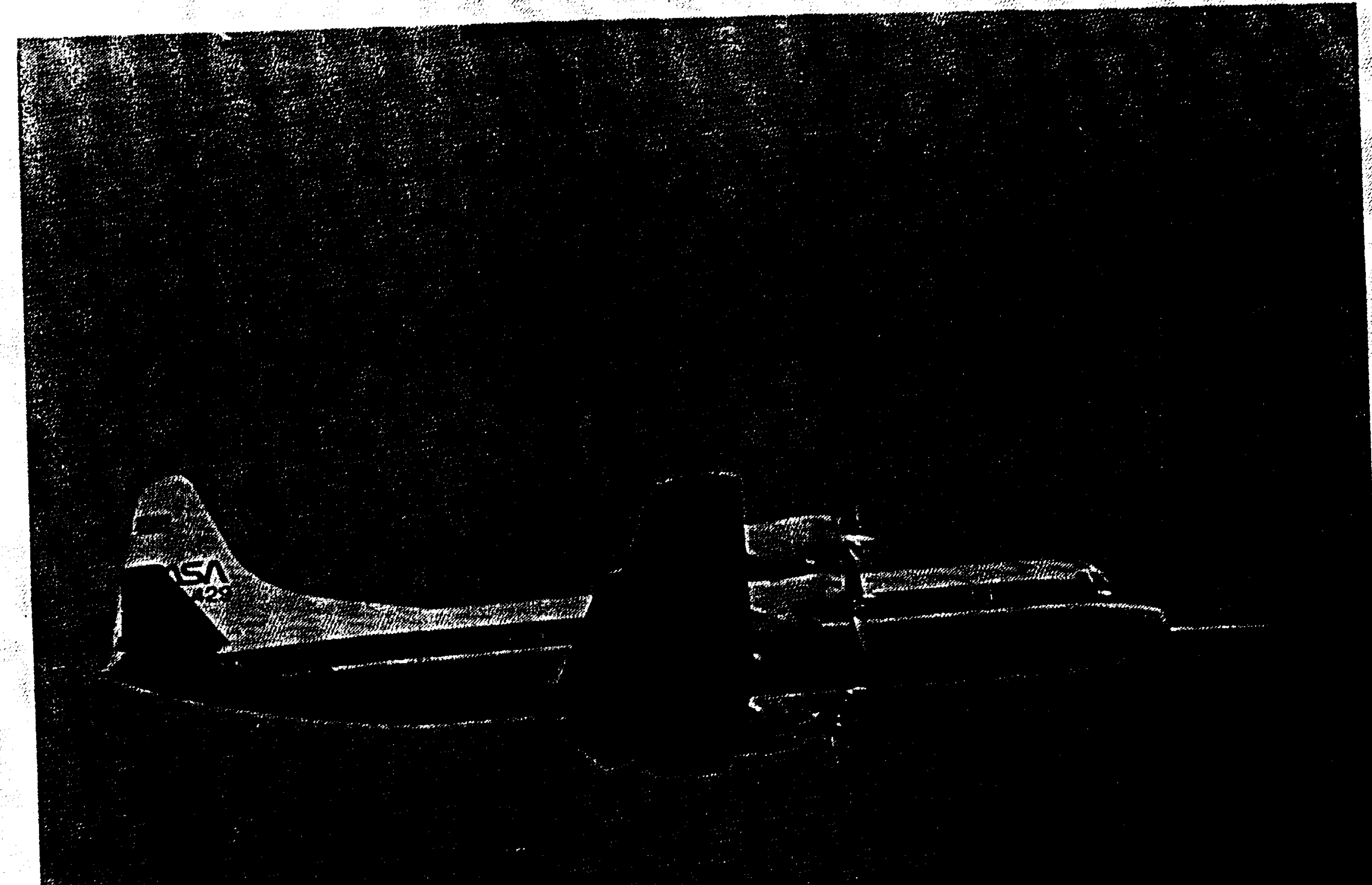


Figure PPLR-2.

NASA 429, L-188 Electra Aircraft (WFF)

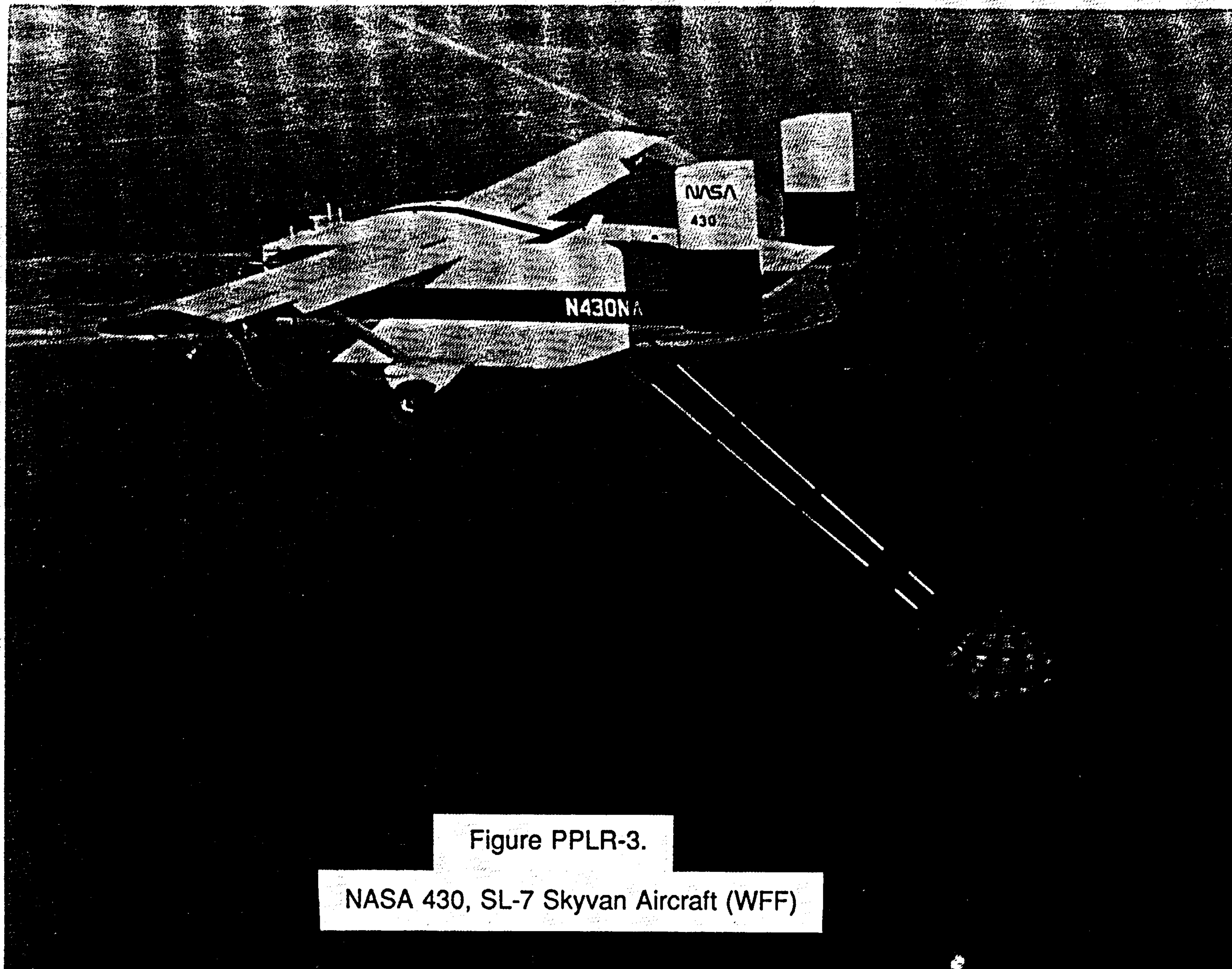


Figure PPLR-3.

NASA 430, SL-7 Skyvan Aircraft (WFF)

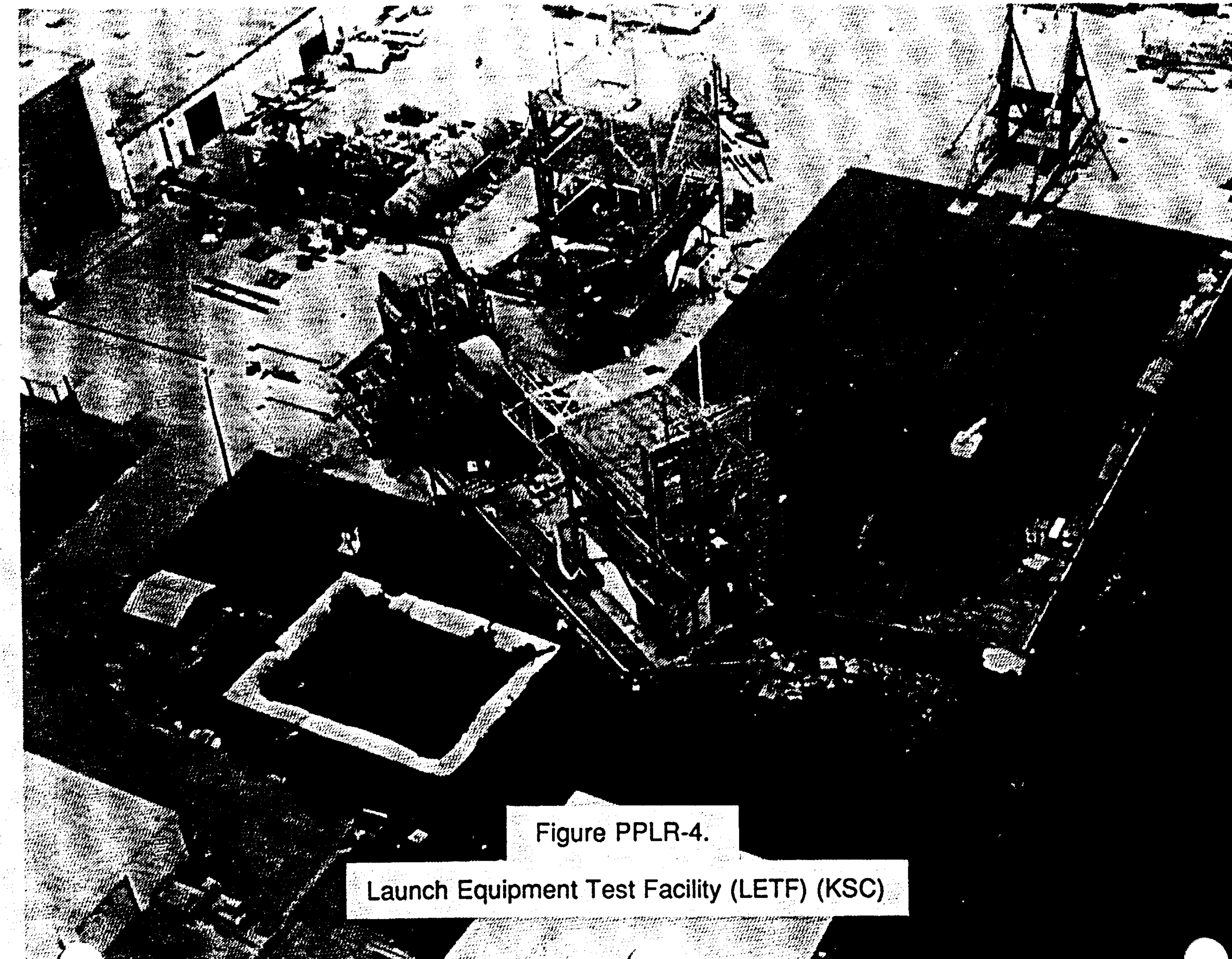


Figure PPLR-4.

Launch Equipment Test Facility (LETF) (KSC)

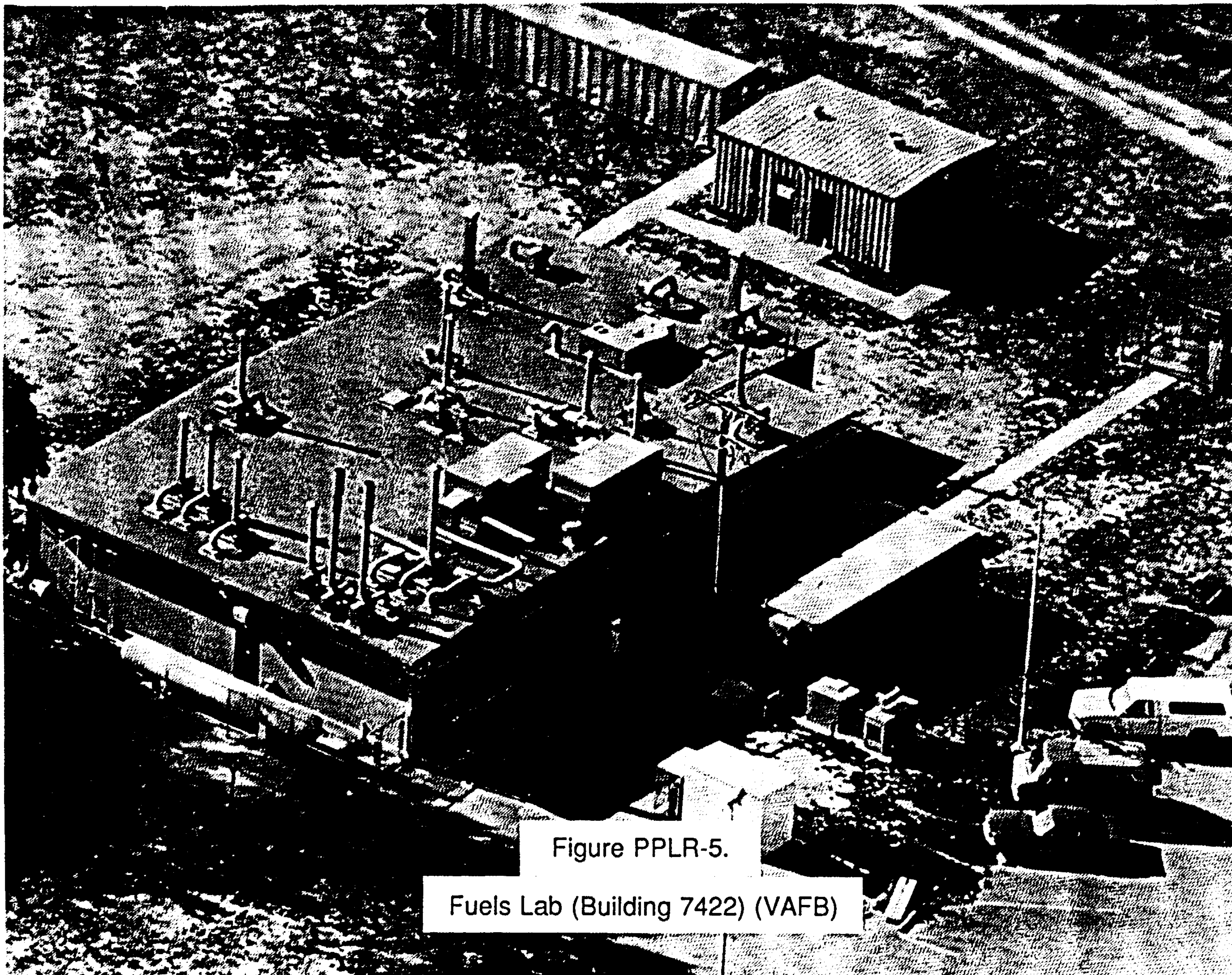


Figure PPLR-5.

Fuels Lab (Building 7422) (VAFB)

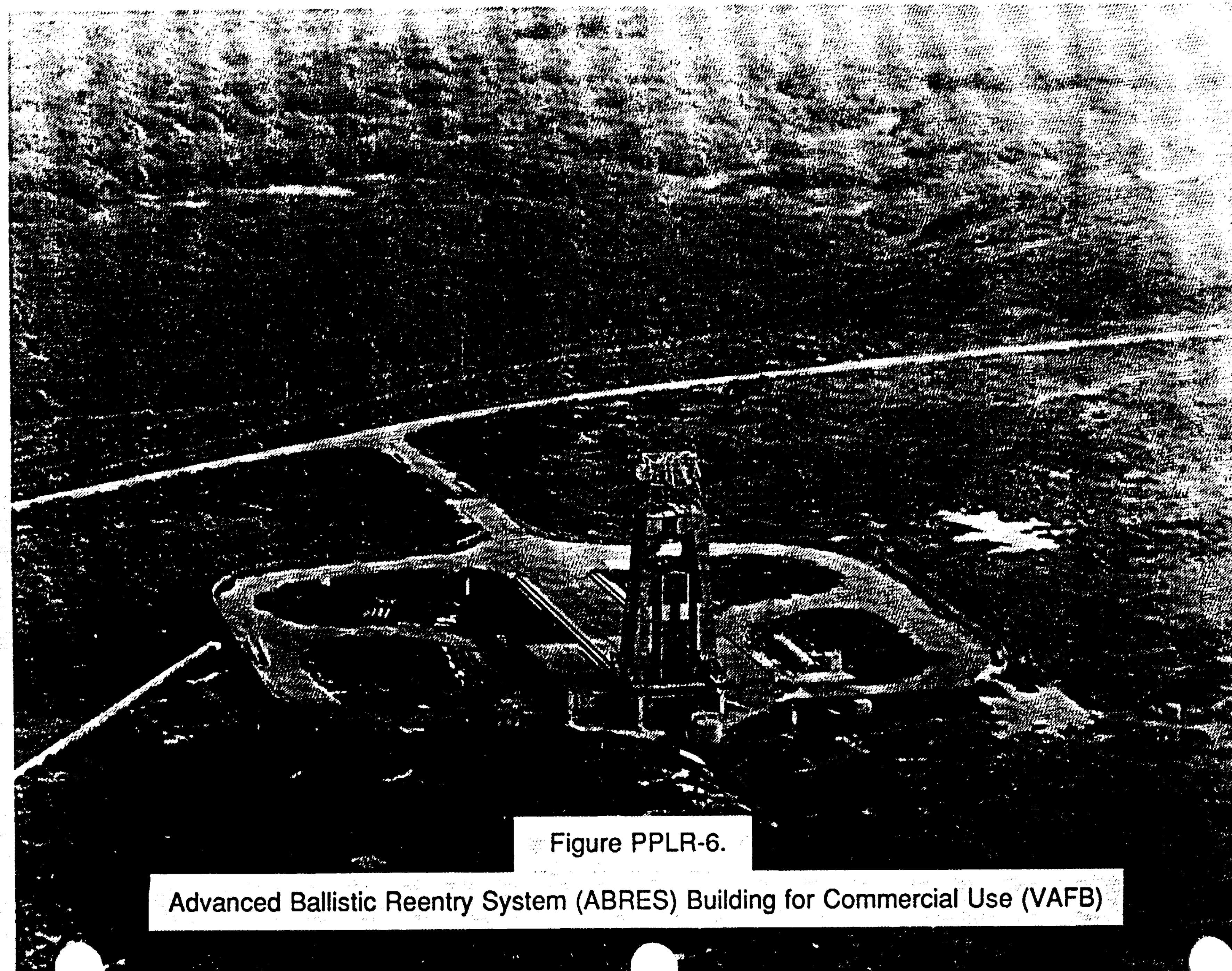


Figure PPLR-6.

Advanced Ballistic Reentry System (ABRES) Building for Commercial Use (VAFB)

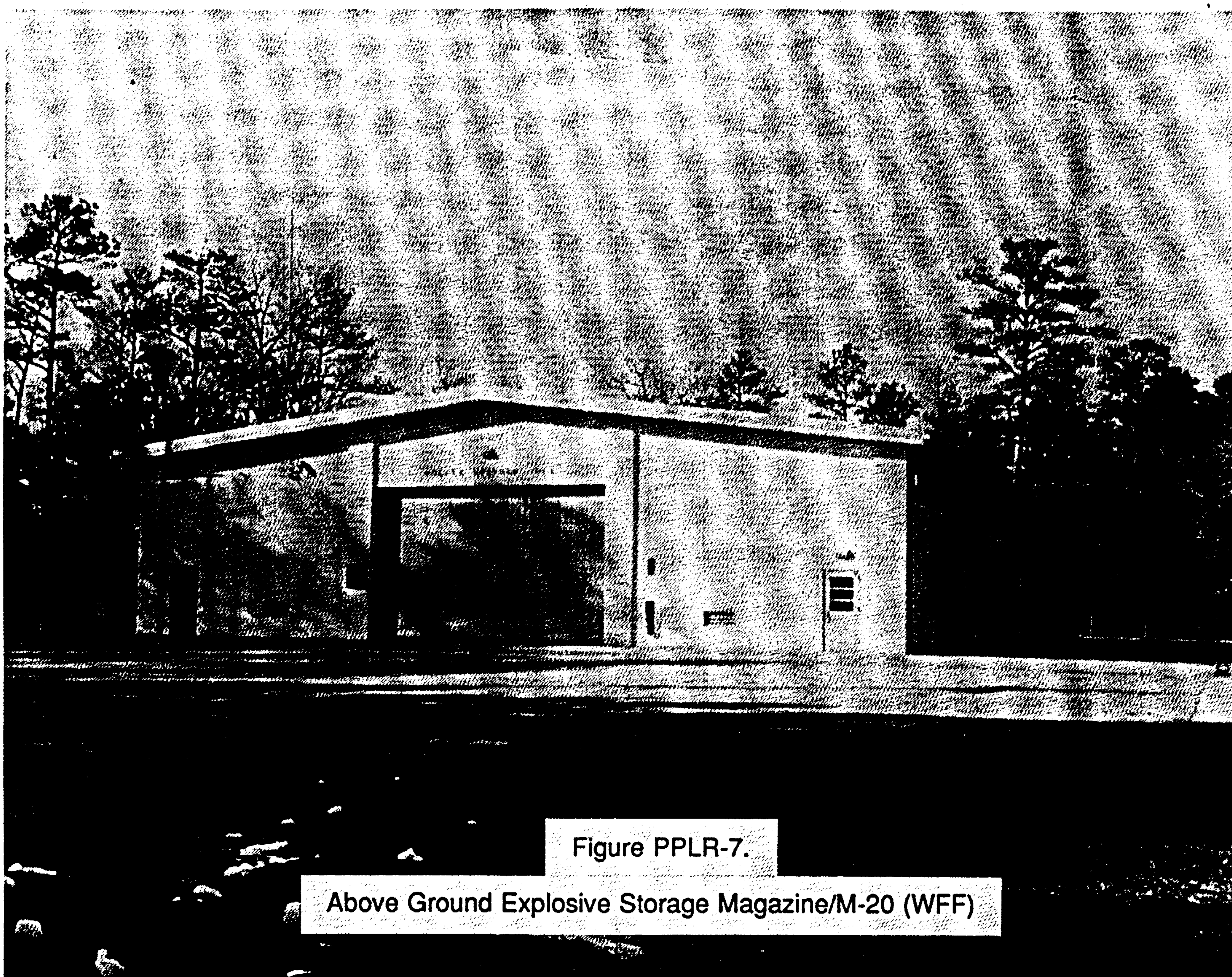


Figure PPLR-7.

Above Ground Explosive Storage Magazine/M-20 (WFF)

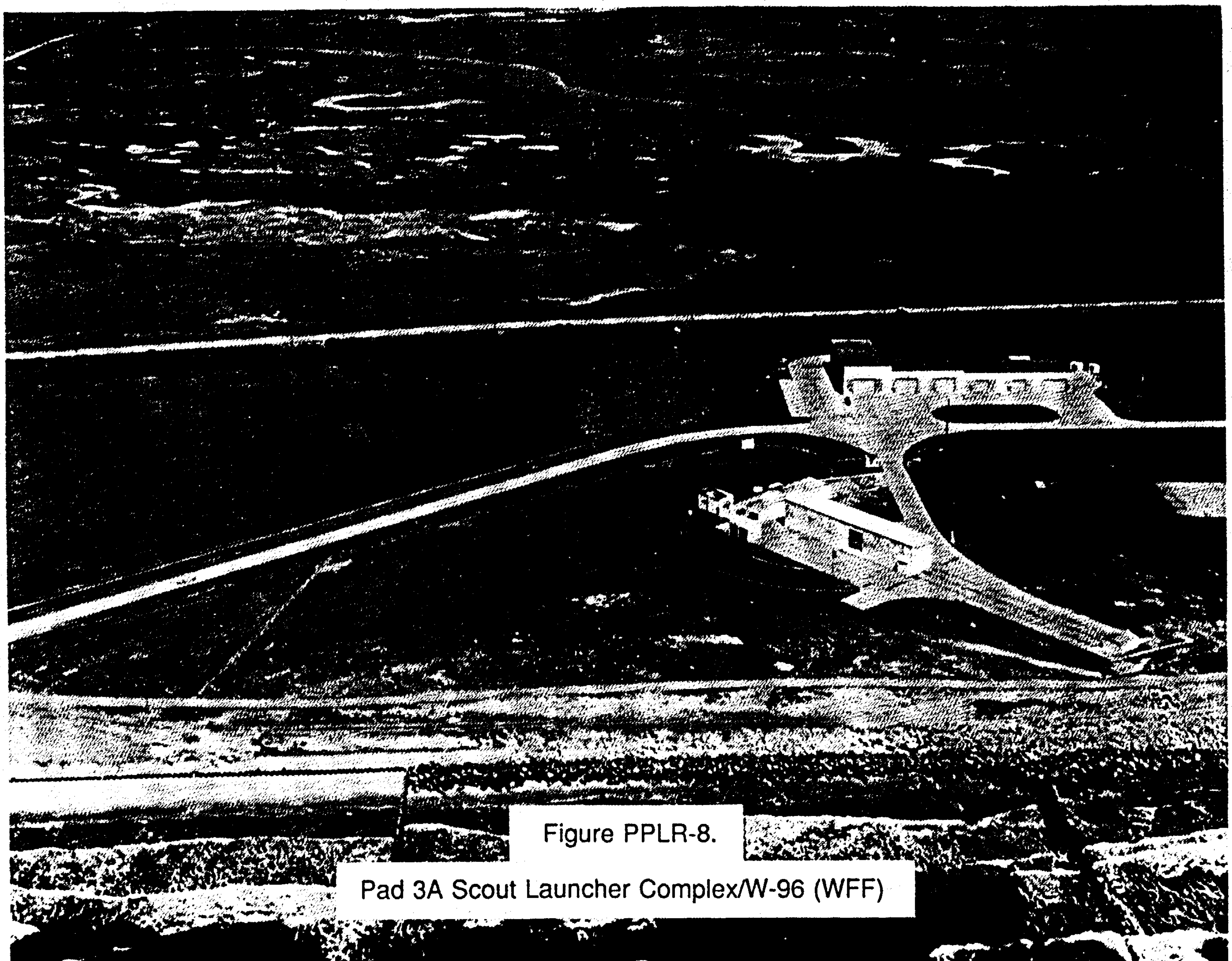


Figure PPLR-8.

Pad 3A Scout Launcher Complex/W-96 (WFF)

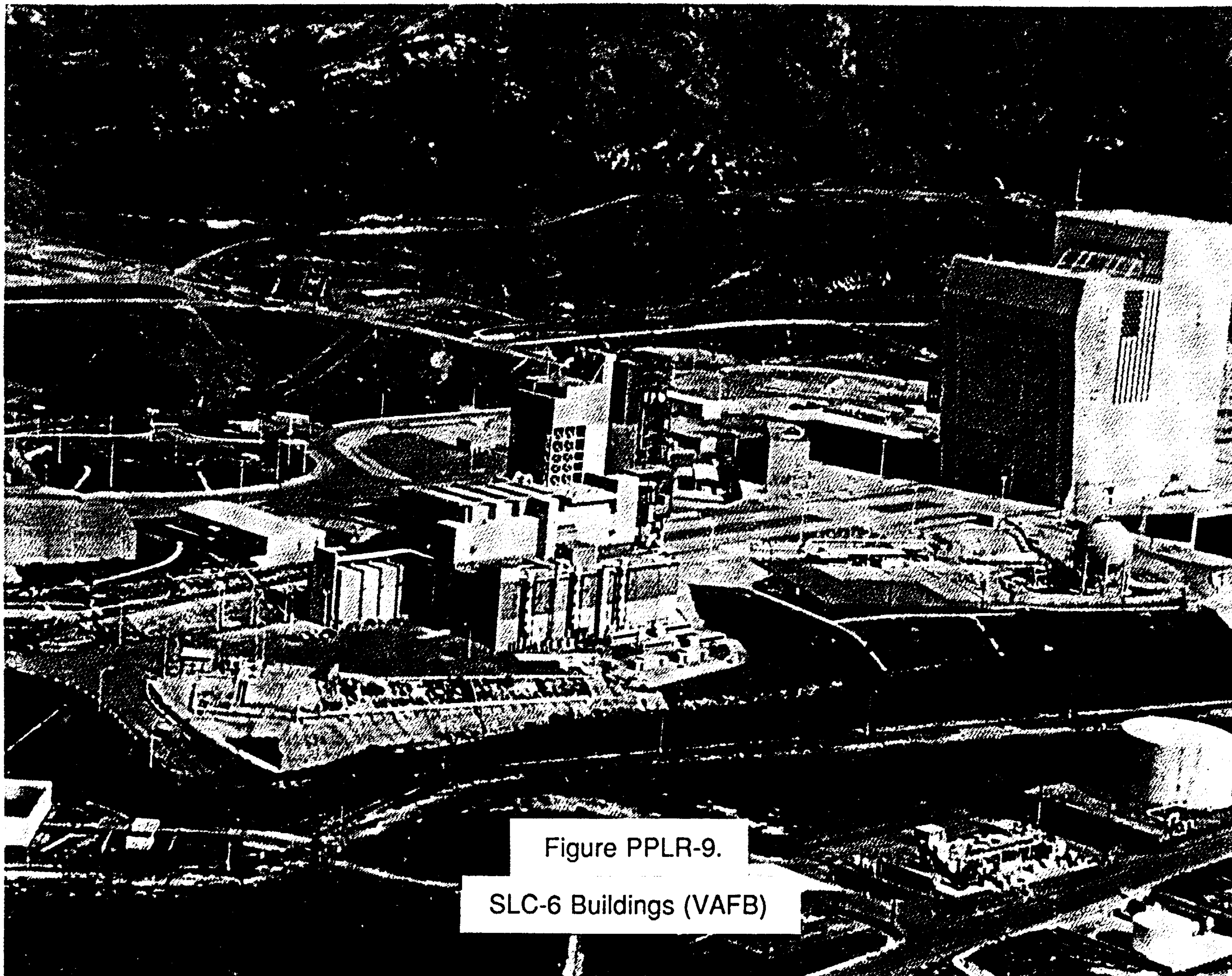


Figure PPLR-9.

SLC-6 Buildings (VAFB)

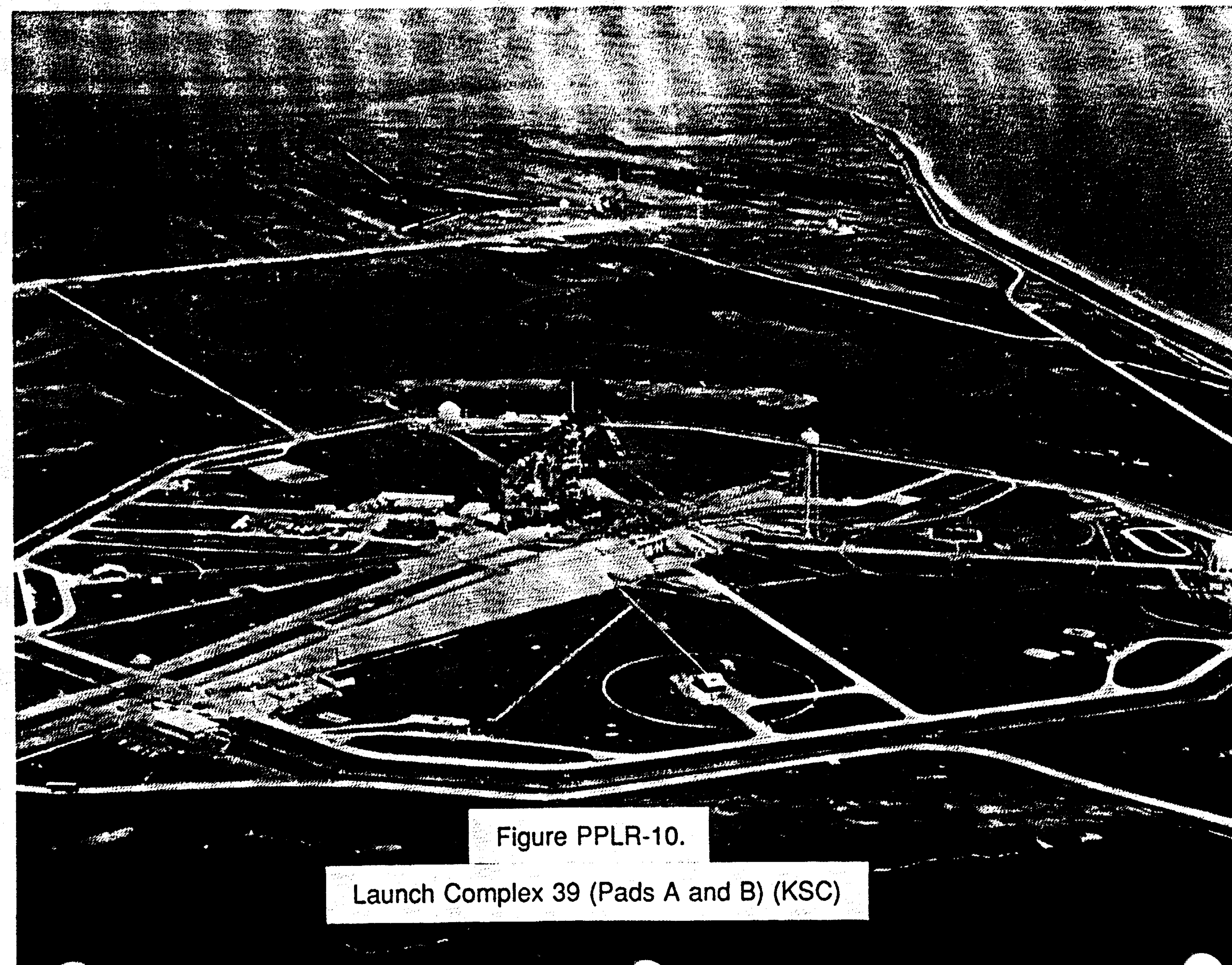


Figure PPLR-10.

Launch Complex 39 (Pads A and B) (KSC)

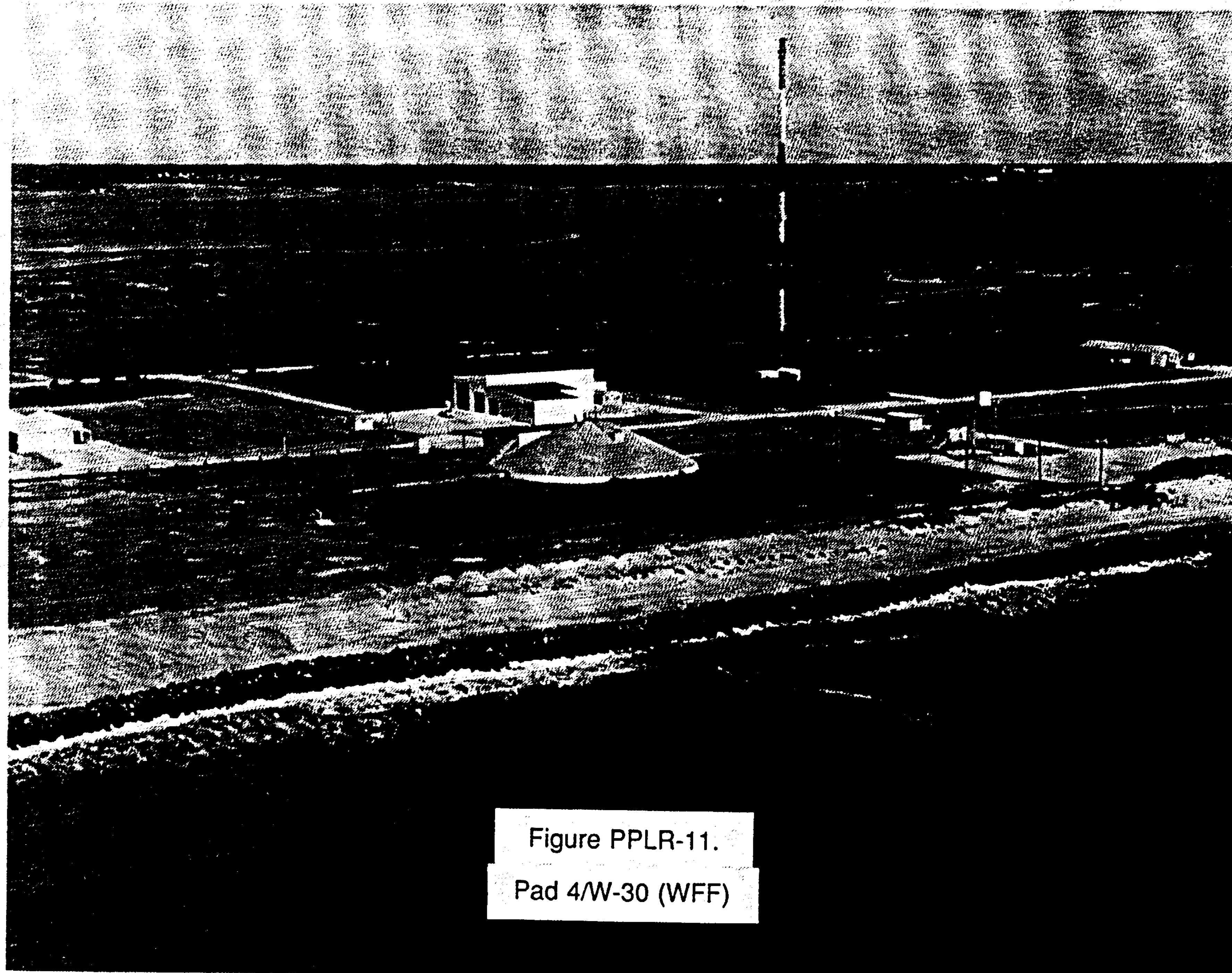


Figure PPLR-11.
Pad 4/W-30 (WFF)

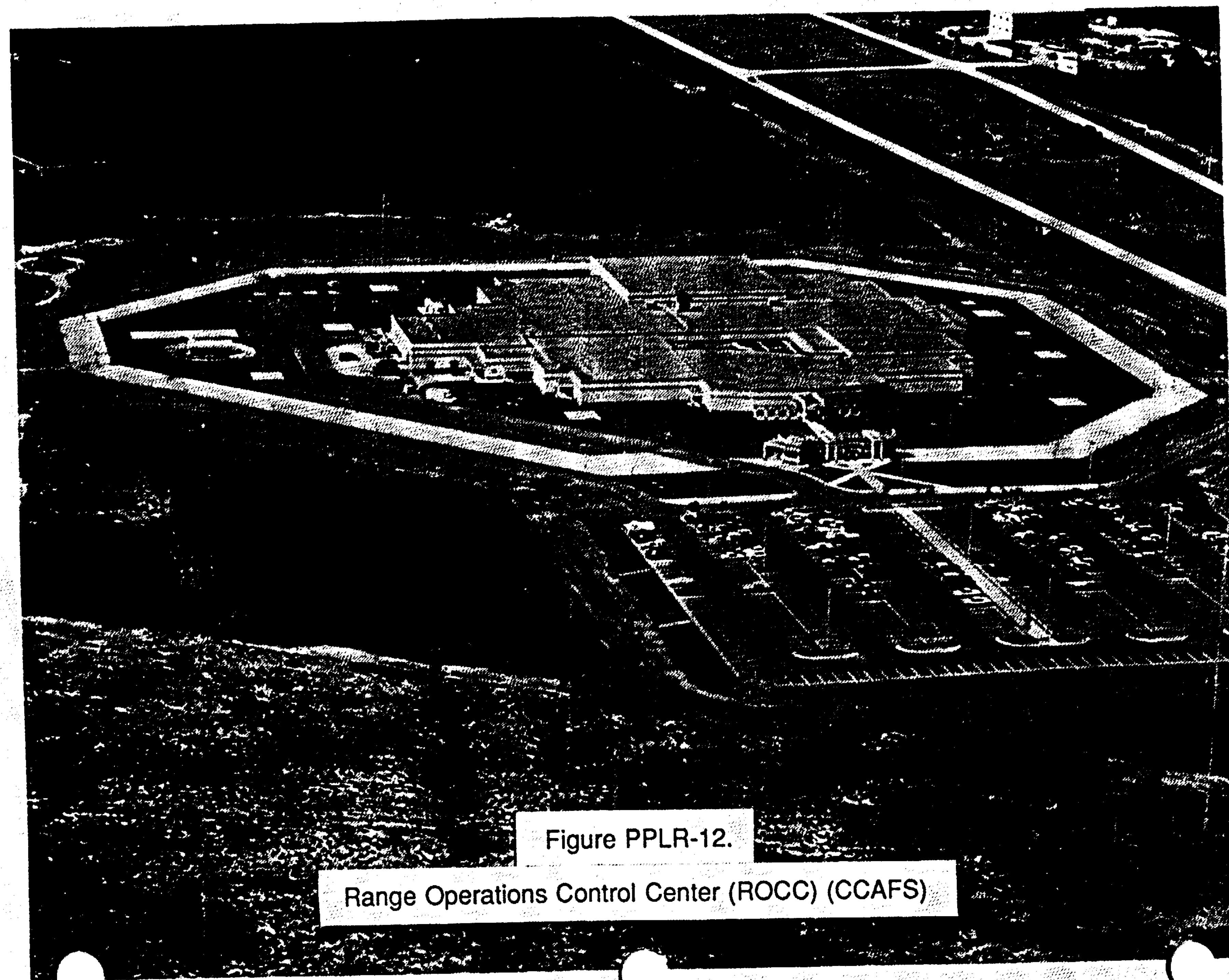


Figure PPLR-12.

Range Operations Control Center (ROCC) (CCAFS)

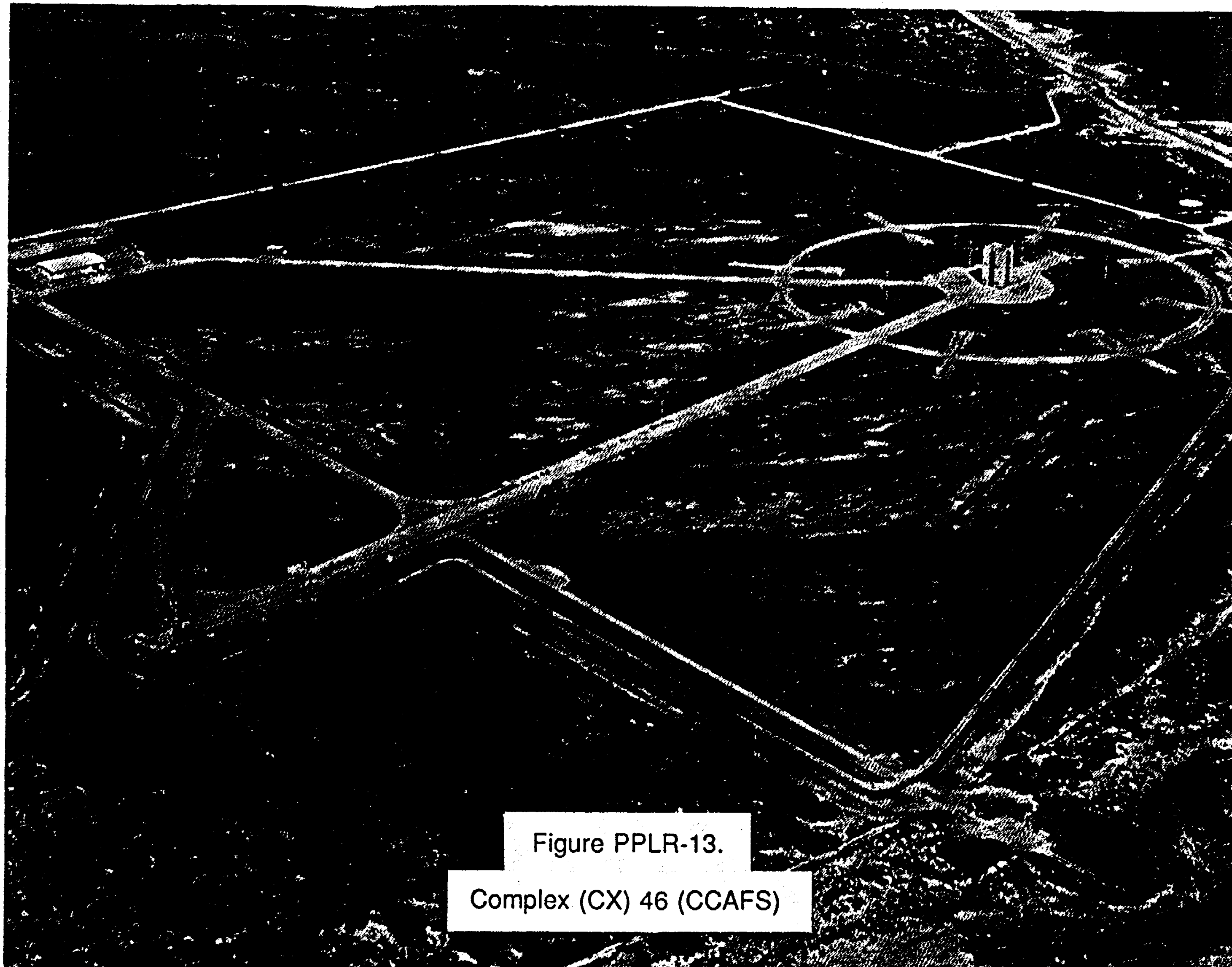


Figure PPLR-13.

Complex (CX) 46 (CCAFS)

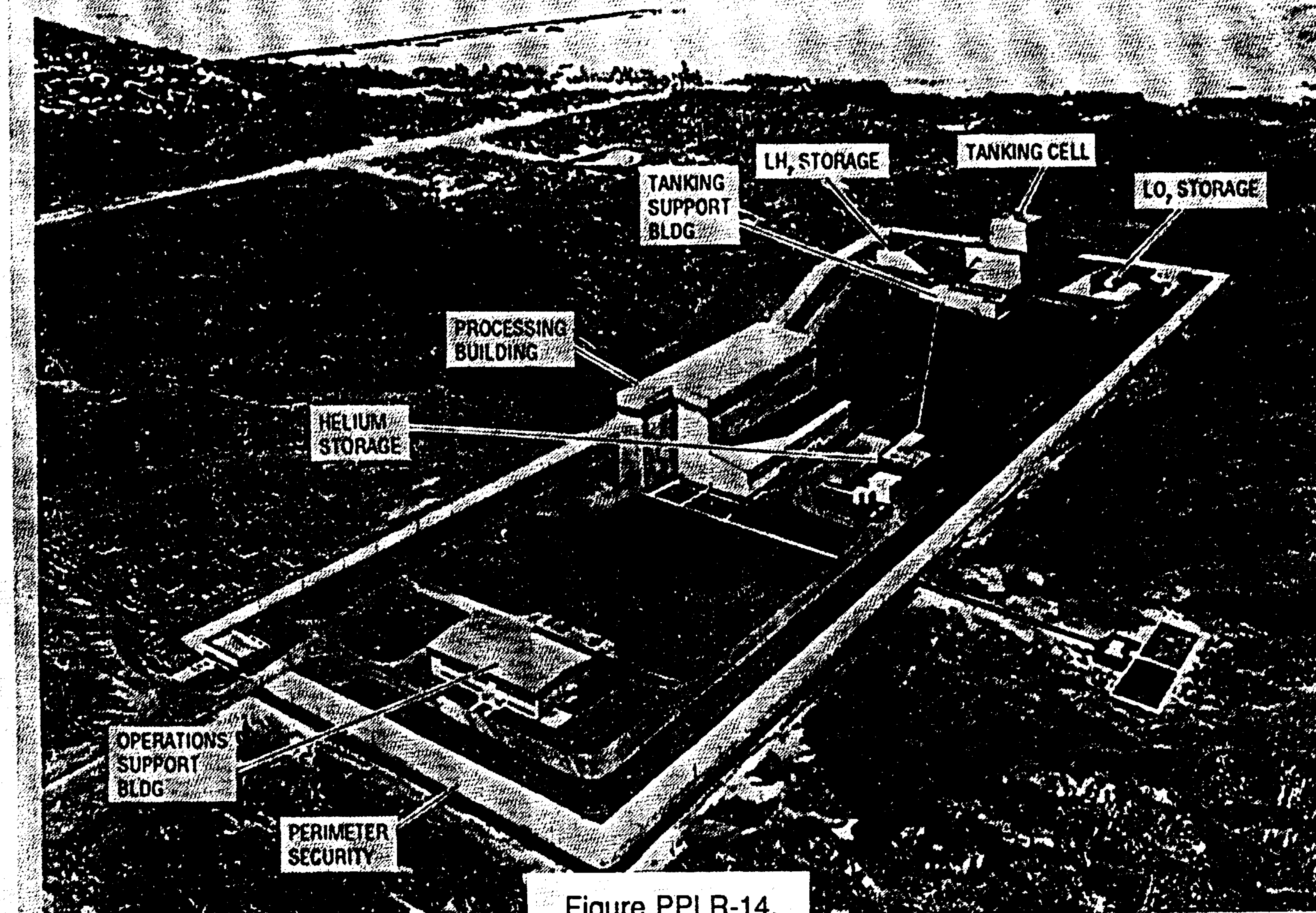


Figure PPLR-14.

Centaur Processing Facility (CPF) (CCAFS)

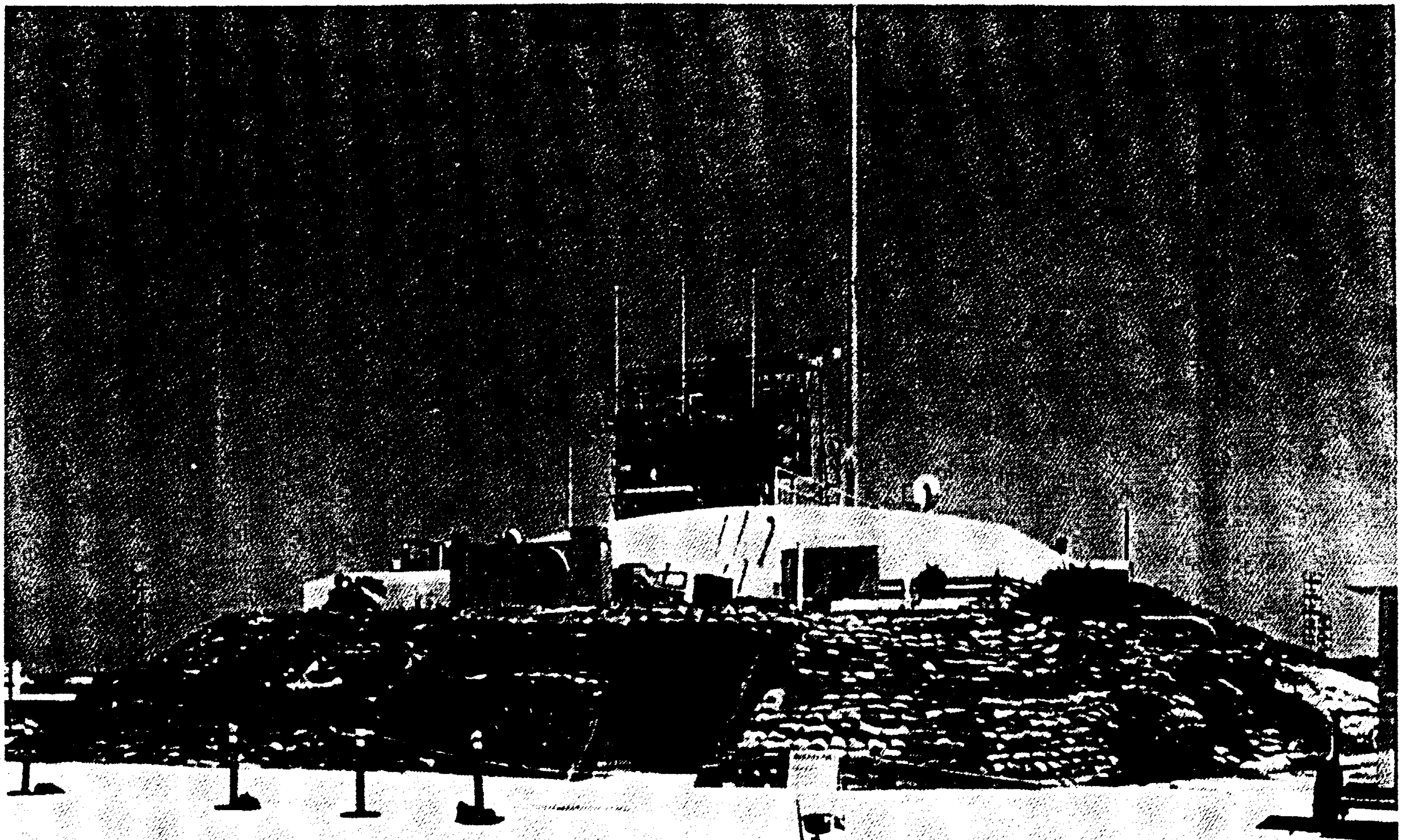


Figure PPLR-15.

SLC-17 Block House (CCAFS)

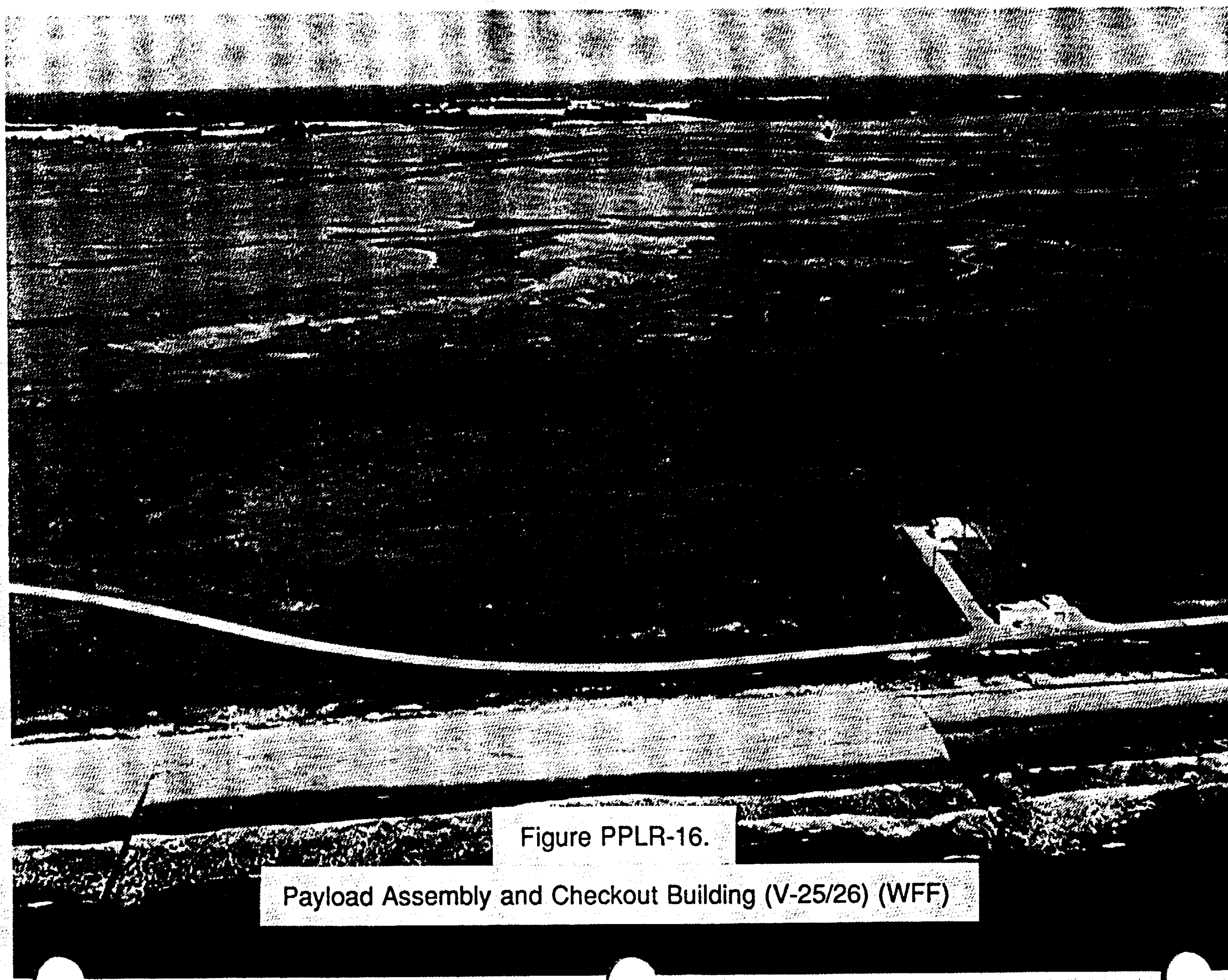


Figure PPLR-16.

Payload Assembly and Checkout Building (V-25/26) (WFF)

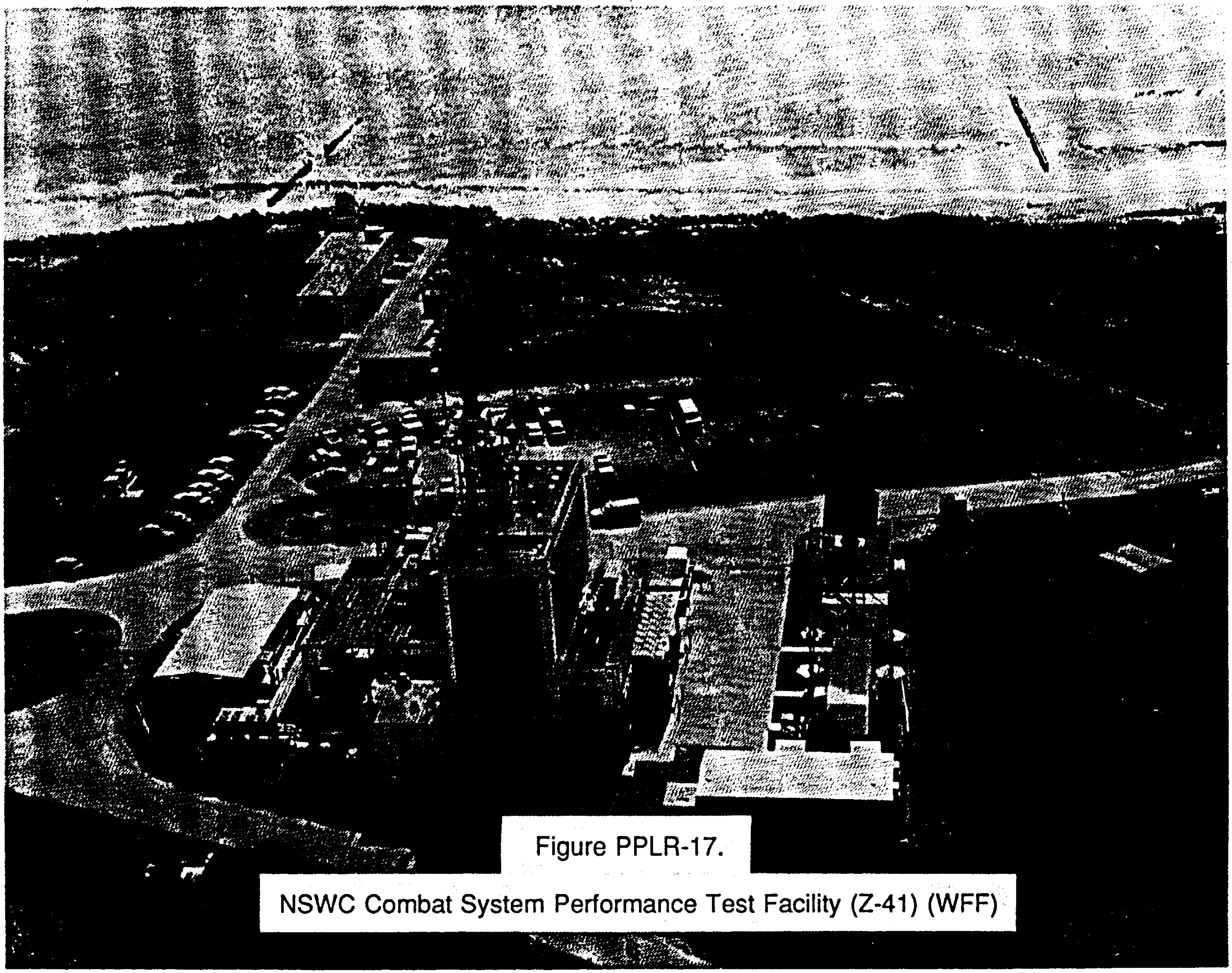


Figure PPLR-17.

NSWC Combat System Performance Test Facility (Z-41) (WFF)

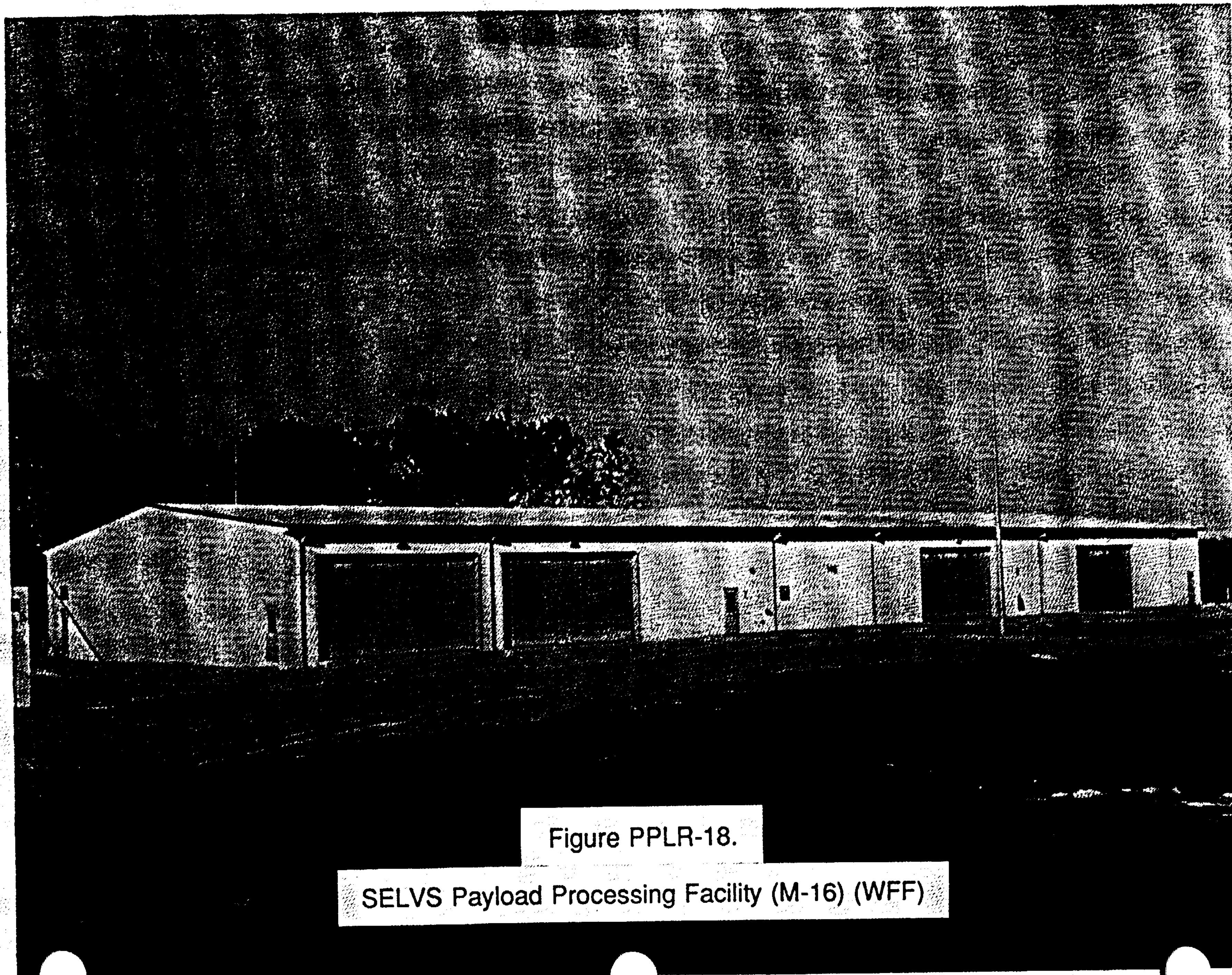


Figure PPLR-18.

SELVS Payload Processing Facility (M-16) (WFF)

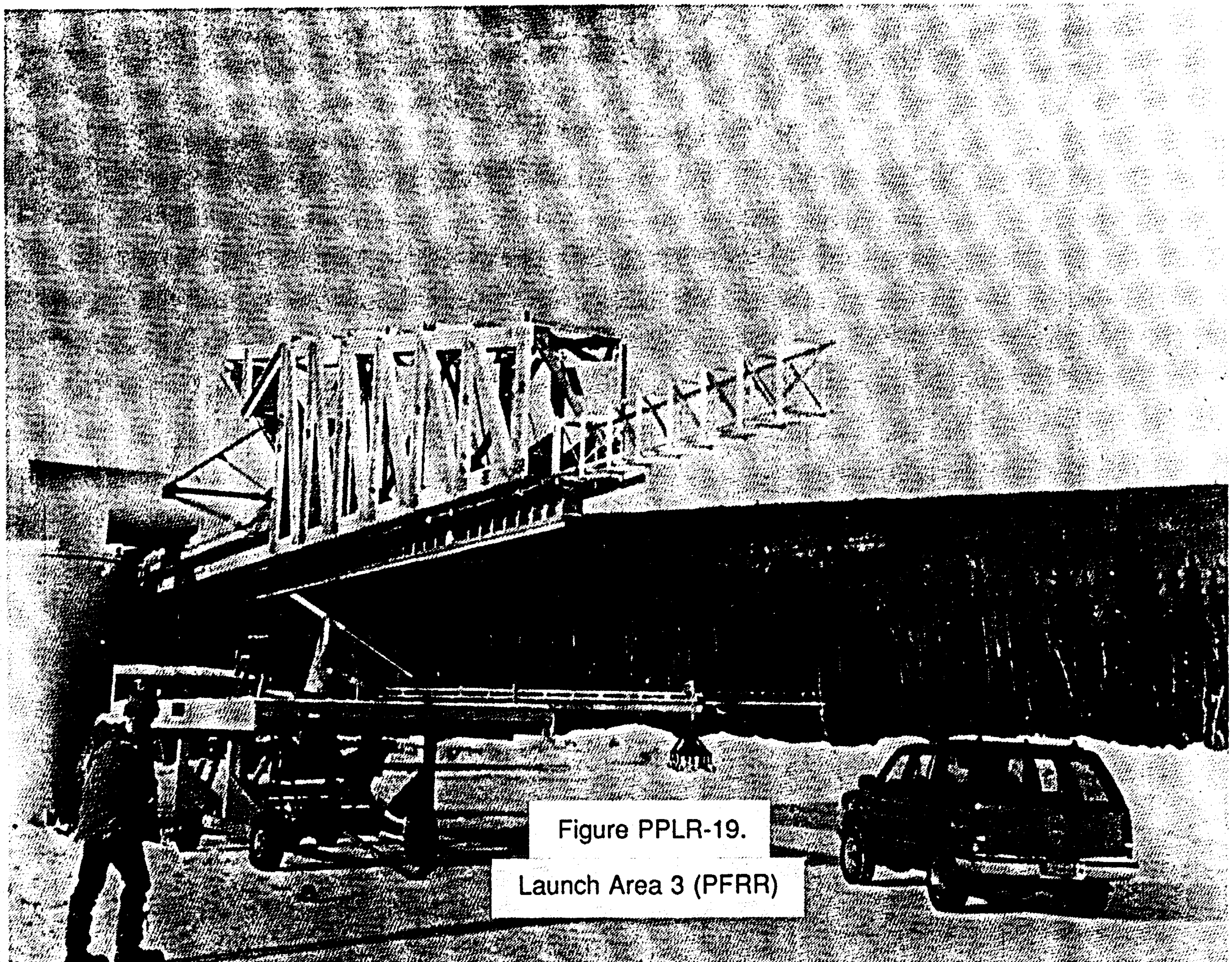


Figure PPLR-19.

Launch Area 3 (PFRR)

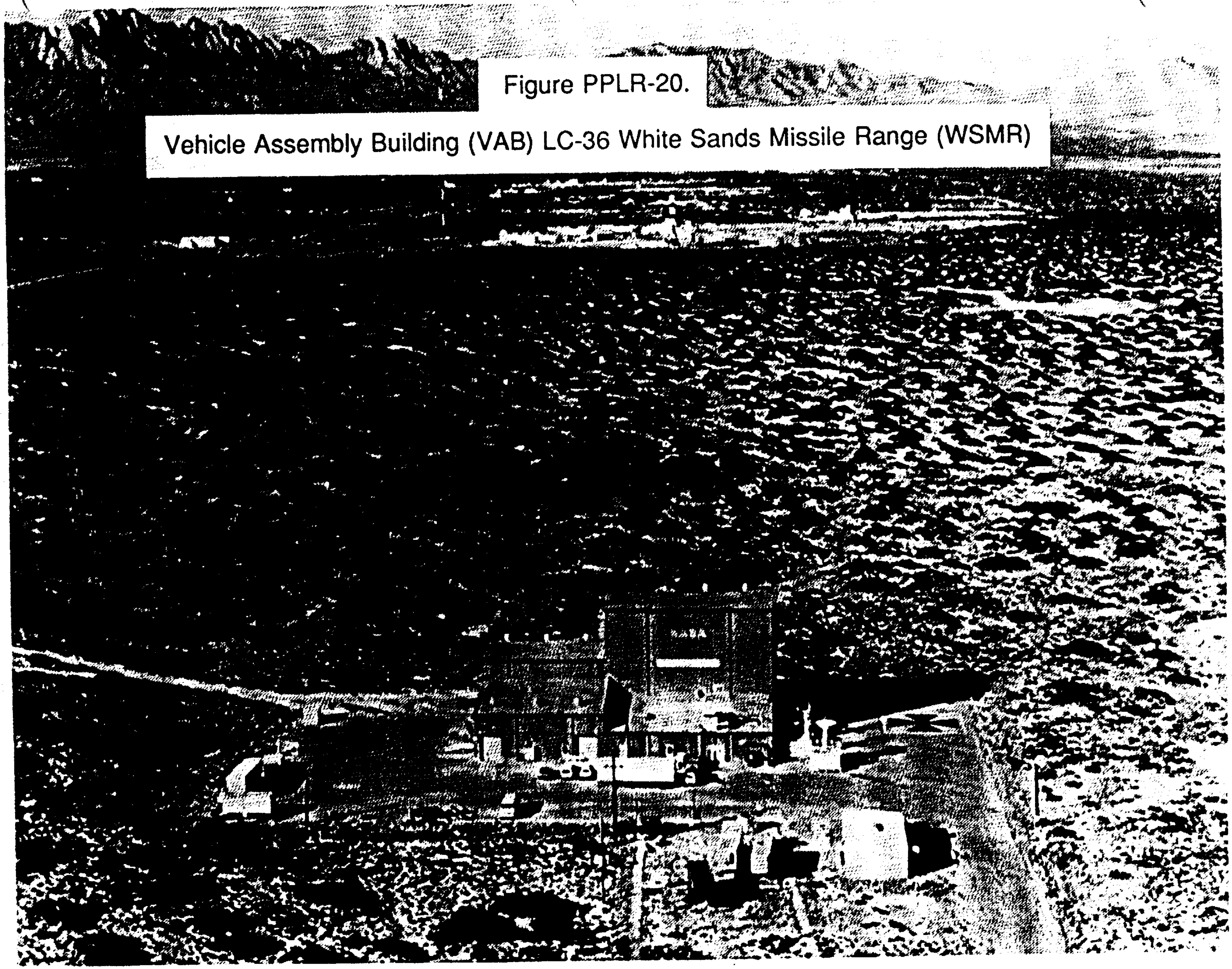


Figure PPLR-20.

Vehicle Assembly Building (VAB) LC-36 White Sands Missile Range (WSMR)

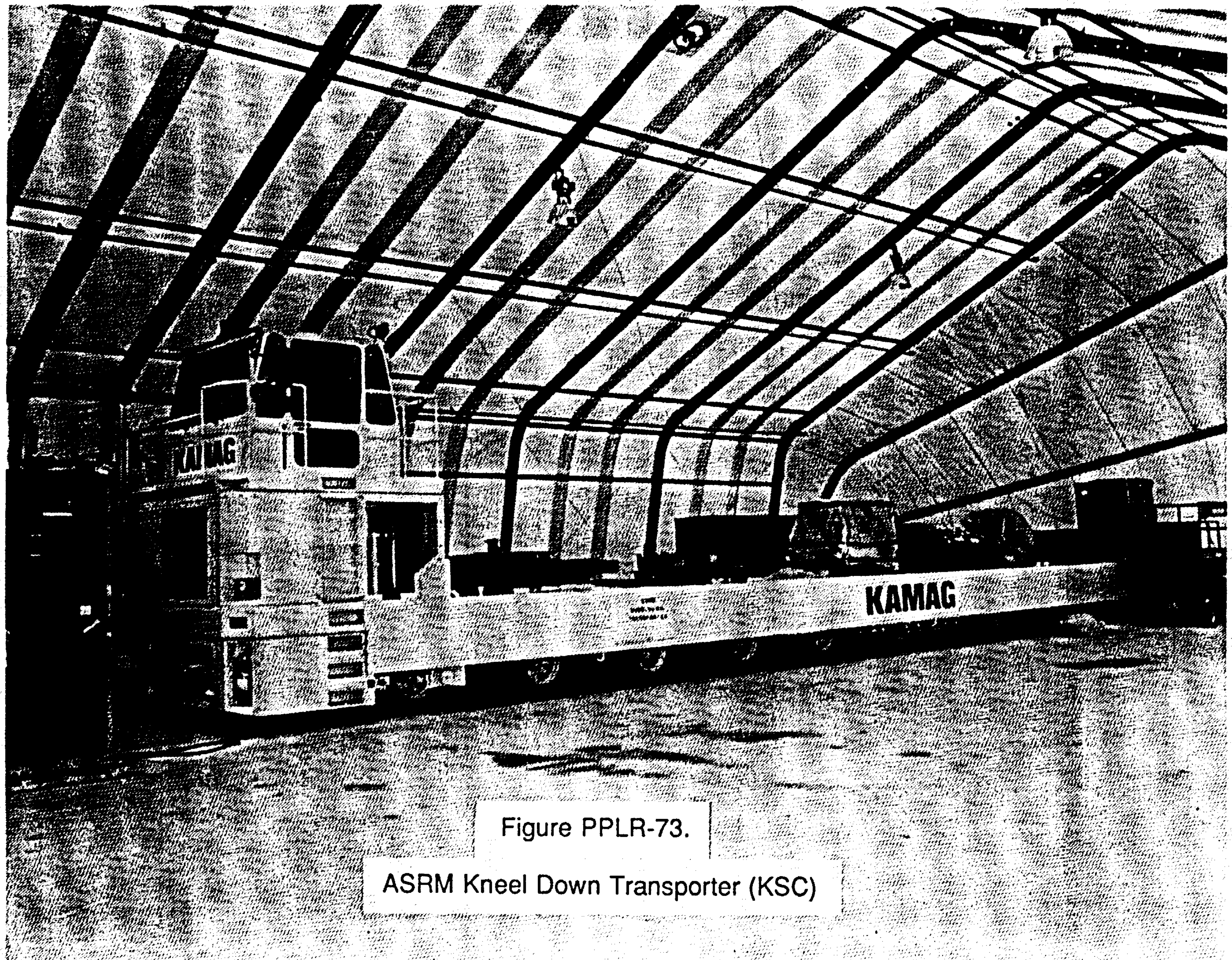


Figure PPLR-73.

ASRM Kneel Down Transporter (KSC)

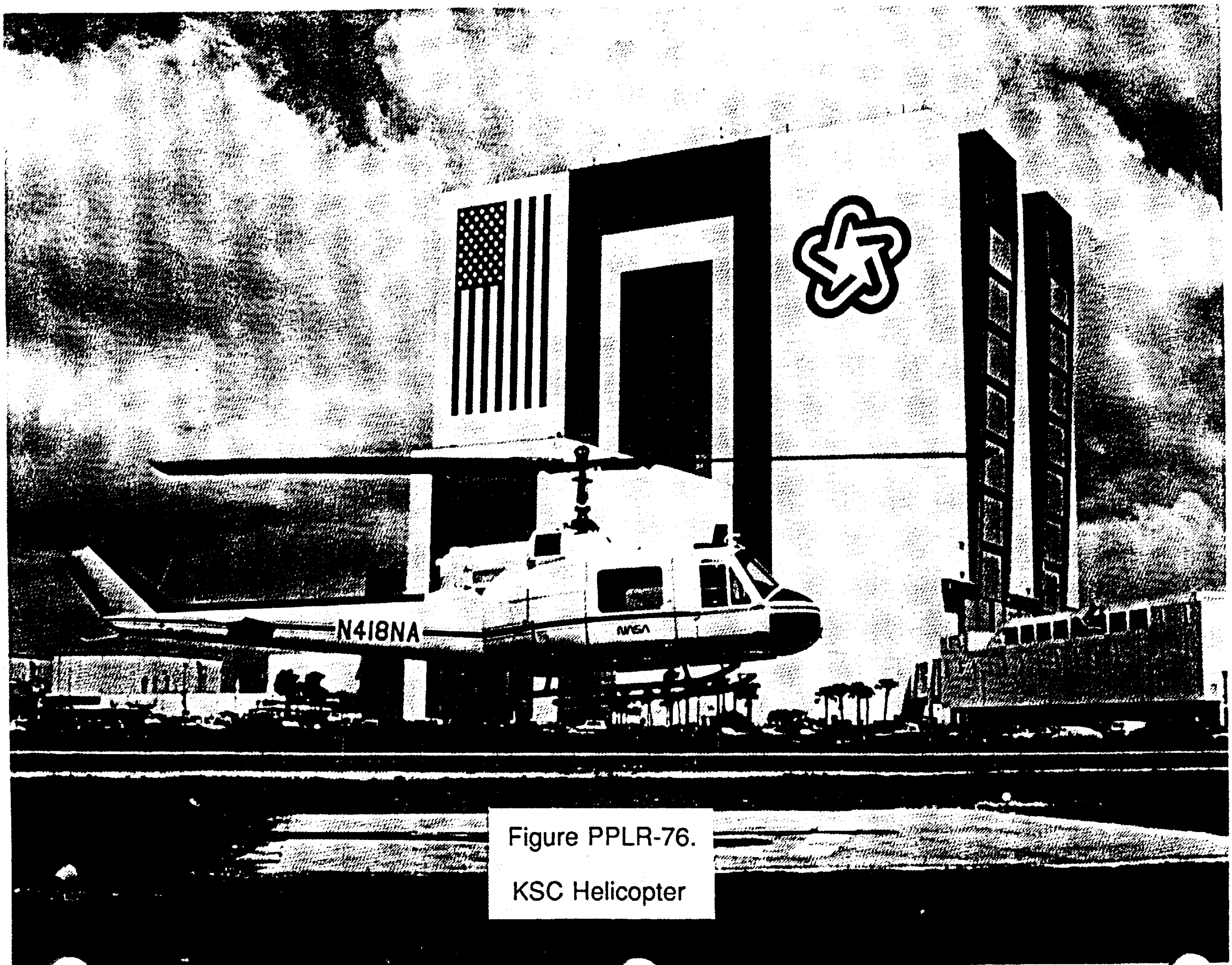


Figure PPLR-76.

KSC Helicopter

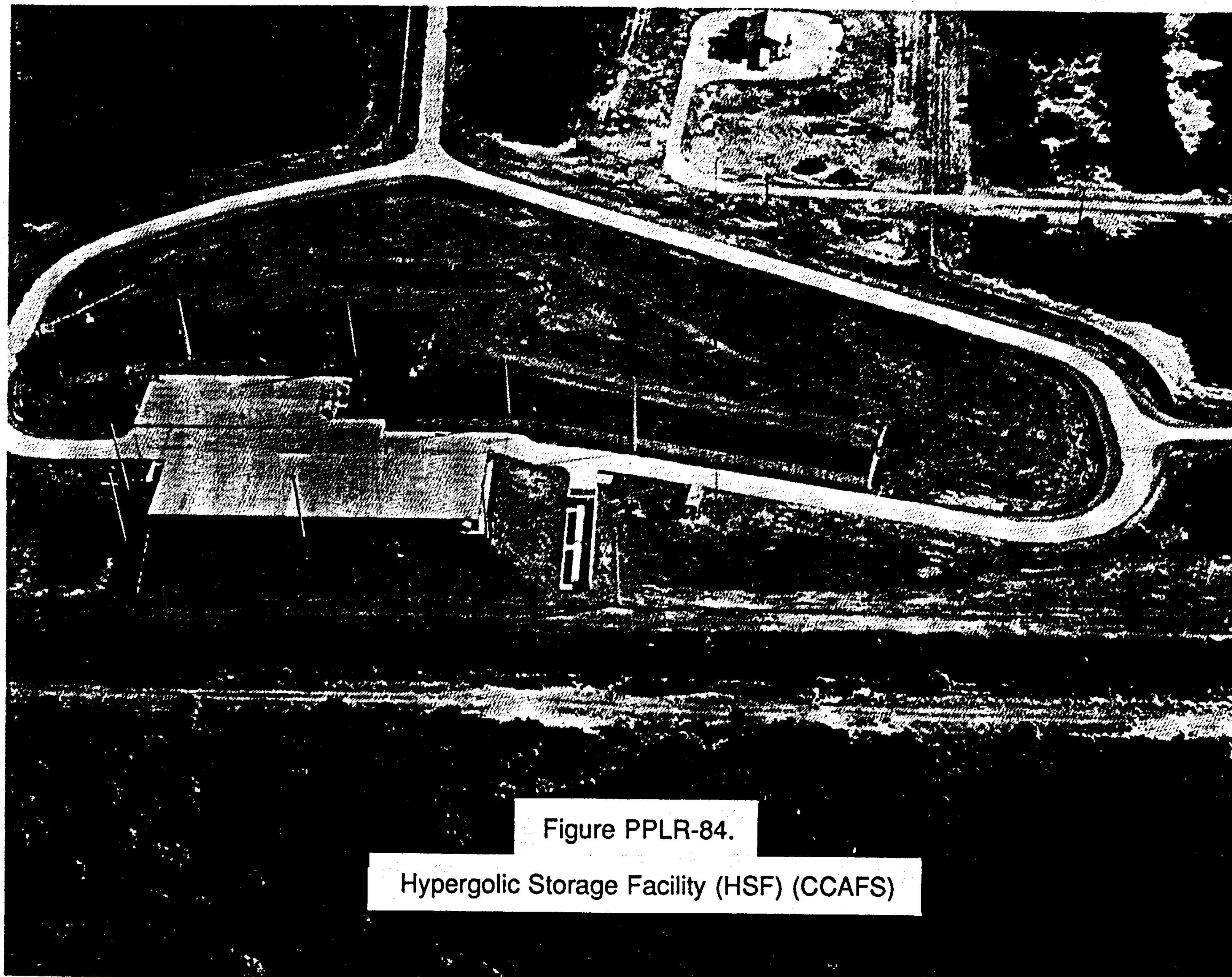


Figure PPLR-84.

Hypergolic Storage Facility (HSF) (CCAFS)

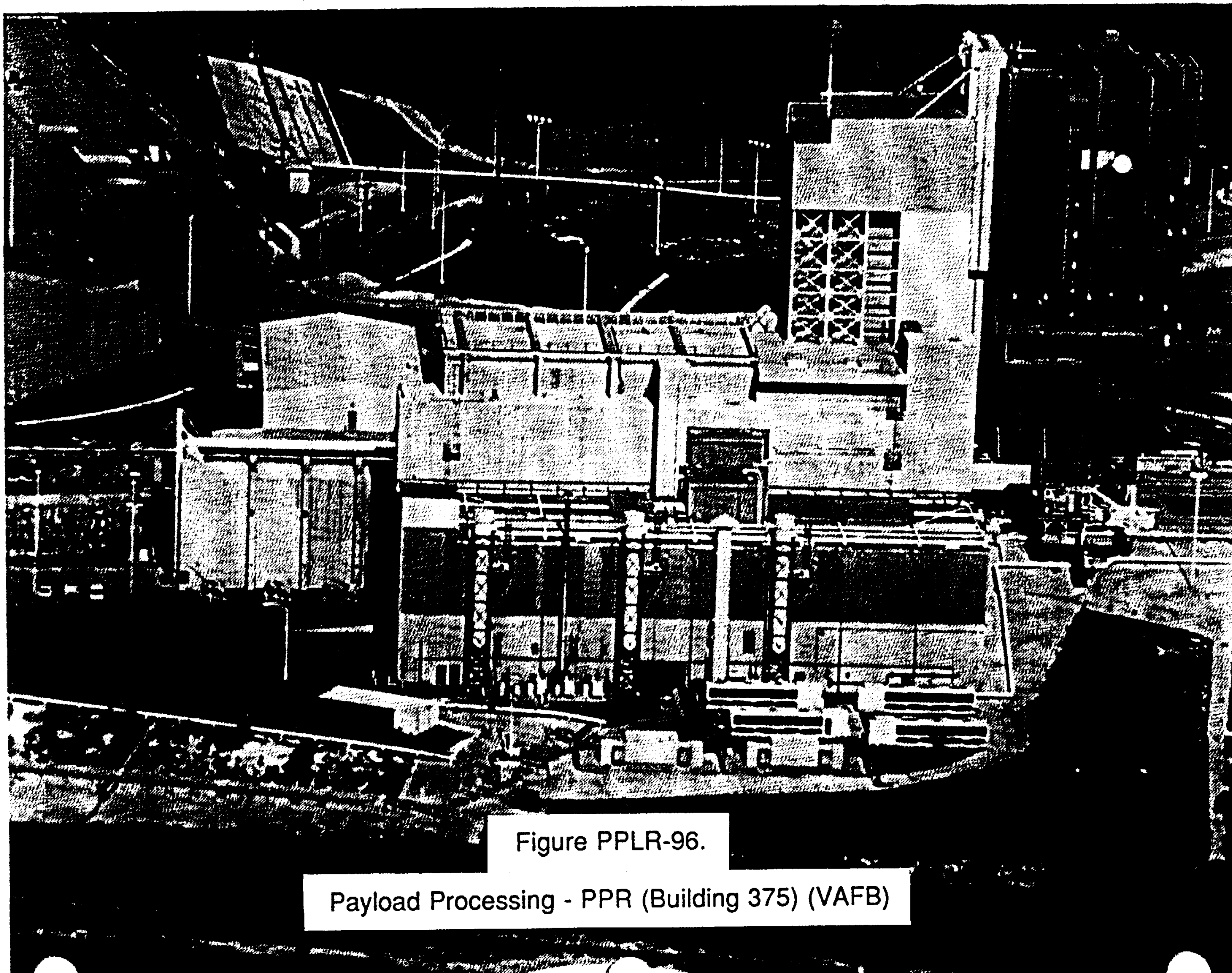


Figure PPLR-96.

Payload Processing - PPR (Building 375) (VAFB)

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

CATEGORY 1B's

The following list of facilities represents those facilities where the team recommends no change (required to support the Mission Model).

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
1	No Change to Space Station Processing Facility (SSPF)	1B
2	No Change to End-of-Mission (EOM) Landing Sites	1B
3	No Change to Orbiter Mate/Demate Device (MDD)	1B
4	No Change to Major KSC Administrative Buildings	1B
5	No Change to the Canister Rotation Facility (CRF)	1B
6	No Change to the Central Instrumentation Facility	1B
7	No Change to Major KSC Warehouse Facilities	1B
8	No Change - Shuttle Crawler Transporter (CT)	1B
9	No Change to Electromagnetic Laboratory	1B
10	No Change to Engineering Development Laboratory	1B
11	No Change to the Vehicle Assembly Building (VAB)	1B
12	No Change to Shuttle Hypergol Maintenance Facilities (HMF)	1B
13	No Change - Shuttle Launch Equipment Shop (LES)	1B
14	No Change to the Shuttle Launch Control Center (LCC)	1B
15	No Change - Shuttle Mobile Launcher Platform (MLP)	1B
16	No Change to the Orbiter Processing Facilities (OPF's)	1B
17	No Change to the Orbiter Transporter	1B
18	No Change - Shuttle Ordnance Storage Facility	1B
19	No Change to the Payload Shipping Container (Hubble)	1B
20	No Change to the Payload (P/L) Canister	1B
21	No Change to the Payload Support Building (PSB)	1B

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
22	No Change to the Processing Control Center (PCC)	1B
23	No Change to the SRB Processing and Segment Storage Facility	1B
24	No Change to the SRM Transporters	1B
25	No Change to the Vertical Processing Facility (VPF)	1B
26	No Change to the Thermal Protection System Facility	1B
27	No Change to the Turn Basin	1B
28	No Change to Spacecraft Assembly & Encapsulation Facility #2 (SAEF-2)	1B
29	No Change to the Payload Hazardous Servicing Facility (PHSF)	1B
30	No Change to the Radioisotope Thermal General (RTG) Building	1B
31	No Change to Hangar AE	1B
32	No Change to the Solid Rocket Booster (SRB) Recovery Facility/Hangar AF	1B
33	No Change to the Solid Rocket Booster (SRB) Recovery Ships	1B
34	No Change to Hangar S	1B
35	No Change to Launch Complex (CX) 20	1B
36	No Change to Hangar L	1B
37	No Change to Augmented Emergency Landing Sites (ELS's) High and Low Inclination	1B
38	No Change to the VAFB Delta Launch and Launch Support Facilities, Space Launch Complex-2 (SLC-2)	1B
39	No Change to NASA/KSC Payload Support Facilities at VAFB	1B
40	No Change to the Emergency Landing Sites (ELS's) High and Low Inclination	1B
41	No Change to Payload Storage Facilities	1B
42	No Change to Sounding Rocket Launch Facilities (PFRR)	1B

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
43	No Change to Mobile Launchers	1B
44	No Change to Liquid Propellant Storage	1B
45	No Change to Payload Processing Facilities	1B
46	No Change to Range Support Facilities	1B
47	No Change to Blockhouses 1, 2, and 3	1B
48	No Change to Launch Vehicle Assembly Shops	1B
49	No Change to Launch Pads	1B
50	No Change to Spin Balance Facility	1B
51	No Change to Fixed Telemetry Systems	1B
52	No Change to Mobile Telemetry Systems	1B
53	No Change to Command/Control/Communications	1B
54	No Change to NASA Balloon Program Support	1B
55	No Change to Surveillance Radar Systems	1B
56	No Change to Rocket Motor/Pyrotechnic Storage	1B
57	No Change to Facilities Support	1B
58	No Change to NASA Sounding Rocket Program Support	1B
59	No Change to Logistics Facilities	1B
60	No Change to Mobile Instrumentation Radar	1B
61	No Change to Engineering Support Facilities	1B
62	No Change to Meteorological/Atmospheric Facilities	1B
63	No Change to Range Control Center	1B

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
64	No Change to Management/Administration Facilities	1B
65	No Change to Optical Tracking Facilities	1B
66	No Change to Fixed Instrumentation Radars	1B
67	No Change to Research Airport	1B
68	No Change to Range Surveillance and Research Aircraft	1B
69	No Change to Weather Operations Building	1B
70	No Change to Fuel Storage Area 5	1B
71	No Change to KSC Shuttle Landing Facility (SLF) Weather Observation Facility	1B
72	No Change to Fuel Storage Area 2	1B
73	No Change to the Jonathan Dickinson Missile Tracking Annex (JDMTA)	1B
74	No Change to Satellite Assembly Building (SAB)	1B
75	No Change to Delta Horizontal Processing Facility	1B
76	No Change to Delta Second Stage Checkout Facility	1B
77	No Change to Complex (CX) 47 Launch Control Building	1B
78	No Change to Command/Control Building	1B
79	No Change to Delta Flight Hardware Storage Facility	1B
80	No Change to Delta Solid Motor Storage Facility	1B
81	No Change to Delta Second Stage High Pressure Test Facility	1B
82	No Change to SLC 36 Blockhouse	1B
83	No Change to NAVSTAR Processing Facility (NPF)	1B
84	No Change to NAVSTAR Satellite Storage Facility	1B

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
85	No Change for Hangar M	1B
86	No Change for Delta Mission Checkout (DMCO) Facility	1B
87	No Change to DSCS Processing Facility	1B
88	No Change to Propellant Servicing Facility (PSF)	1B
89	No Change to SLC 17A and B	1B
90	No Change to Use of SLC 36B	1B
91	No Change to Delta Solid Motor Storage Facility (Area 57)	1B
92	No Change to Delta Solid Motor Assembly Facility (Area 57)	1B
93	No Change to Met Rocket Launch Control Building	1B
94	No Change to Met Rocket Munitions Storage Facility	1B
95	Abandon Launch Silos	1B
96	No Change to the Communications Distribution and Switching Center (CD&SC)	1B
97	No Change to the Development Test Lab/M7-581	1B
98	No Change to the Missile Research Test Building (MRTB-II)	1B
99	No Change to Hangar J	1B
100	No Change to Big Three Nitrogen Production Plant	1B
101	No Change to the Converter/Compressor Facility (CCF)	1B

NO CHANGE TO SPACE STATION PROCESSING FACILITY (SSPF)

(NASA) (KSC)

The SSPF is under construction and is located in the KSC Industrial Area. It is a three-story, 457,000-square-foot facility used to process nonhazardous prelaunch/postlanding Space Station elements, payloads, and experiments. The facility consists of a high bay with air lock, used for processing large elements; an intermediate bay used for rack processing, testing, and experiment processing; offline labs to be used by payload/experiment developers; customer support/logistics areas; mezzanine area housing conference and office space; office user control and support rooms, test and simulation area, and observation booth on the second floor; and customer management/office areas on the third floor. The high bay, intermediate bay, and offline labs are all class 100,000, level 4, clean work area.

The high bay is 104 feet wide by 440 feet long by 62 feet high and has eight footprints (4,050 square feet each) used for module and element processing. Each footprint contains the following facility services: 60 Hz power, GN_2/GHe, chilled water, OIS-D, compressed air, ammonia vent system, potable water, wideband comm. system, TCMS, T&CD, alignment pad, and P&AW. The high bay contains two 30-ton bridge cranes with 50-foot hook height. The air lock is 45 feet wide, 90 feet long and 36 feet high. The air lock door width is 30 feet. The airlock contains a 15-ton bridge crane. The intermediate bay is 62 feet wide by 340 feet long by 15 feet high, except in the rack test and experiment processing area in which the ceiling height is 30 feet. Furthermore, the latter area contains two 5-ton bridge cranes. Except for high pressure GN_2 and GHe and alignment pad, the facility services are the same as in the high bay. There are 19 offline labs (2 dark rooms, 2 chemical rooms, and 15 general purpose labs) provided for conduct of payload/experiment preintegration, prelaunch, and postlanding activities. Two-ton and one-ton lift capabilities are available in various labs. The labs also contain raceways and outlet boxes for TCMS, cipher lock double sealed, and one administrative phone per lab.

The control/user rooms and TCMS processing areas are used for test and checkout control rooms to conduct SS-to-SS interface tests, delivery verification tests, launch package interface testing, preparation, testing, and checkout for launch. There are 9 reconfigurable control rooms, each approximately 1,600 square feet, with raised floors, 60 Hz power, UPS, sprinkler system, and the capability for TCMS, OIS-D, OTV, P&AW, high-rate data, administrative phones, and user GSE support. A customer management room and observation booth are used to provide an area for real-time review of test activities. The area has raised floor, TCMS, monitors, data lines, OTV, OIS-D, video, and high bay viewing window.

The SSPF is required to support the mission model and no change is recommended.

See Figures PPLR-21 and PPLR-22.

NO CHANGE TO SPACE STATION PROCESSING FACILITY (SSPF)

(NASA) (KSC)

DESCRIPTION: The SSPF is a new (under construction) large nonhazardous processing facility for processing Space Station elements at NASA/KSC. The SSPF consists of a large, class 100,000 clean room, adjoining airlock, receiving area for shipments, and three floors of offices and control rooms. The SSPF, when completed, will be fully utilized to support the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO END-OF-MISSION (EOM) LANDING SITES

(NASA/ DOD) (KSC) (DRYDEN)

The EOM sites provide for safe landing of the Orbiter, crew, and payload upon completion of a mission. While each site differs, they both contain essentially the same systems and equipment.

Shuttle Landing Facility (SLF) - KSC

The SLF consists of a 15,000-foot, portland cement, concrete runway oriented 15/33 that is 300 feet wide with 1,000-foot under/overruns at each end. The SLF is equipped with NAV/landing aids - TACAN-MSBLS aim point-PAPI lights-ball/bar and distance-to-go markers. Ground and ground-to-air communications are available. Fire and crash and rescue and medical support is provided prior to Shuttle launch and landing. The SLF also serves as a return-to-launch site/ abort-once-around (RTLS/AOA) and emergency landing site (ELS).

Dryden - Edwards AFB

Dryden consists of multiple runways. Runway (R/W) 04/22 is a PCC 15,000 feet long by 300 feet wide and has 1,000-foot and 1,800-foot overruns. The remaining runways (5R/23L, 17L/35R, 15/33, and 18L/36R) are all dry-lake-bed runways 15,000 feet long by 300 feet wide with varying overruns. Edwards AFB is equipped with NAV/landing aids - TACAN-MSBLS aim point-PAPI and crash and rescue and medical support is provided prior to landing. Edwards AFB also serves as an AOA and ELS.

Both EOM sites have a mate/demate device (MDD). These sites complete the launch/landing cycle of the STS system by providing the runways and equipment for safe return of the Orbiter.

See Figure PPLR-23.

NO CHANGE TO END-OF-MISSION (EOM) LANDING SITES

(NASA/DOD) (KSC) (DRYDEN)

DESCRIPTION: There are two Orbiter EOM sites, the KSC Shuttle Landing Facility (SLF) and Edwards AFB (Dryden). Both facilities contain special Orbiter navigational and landing aids along with Orbiter conditioning/safing and purging equipment. While the SLF is the prime EOM site, Dryden provides weather backup and is prime for long-duration and/or heavy download missions. Both of these sites are required to meet the STS mission model; however, neither site is fully utilized and has the potential for additional use.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO ORBITER MATE/DEMATE DEVICE (MDD)

(NASA) (KSC) (DRYDEN)

The MDD's provide a proven method of lifting the Orbiter for mating to or from the 747 Shuttle Carrier Aircraft. They provide a vital transportation link between Dryden and KSC or from other sites to KSC.

The MDD is a fixed, open-truss, steel structure 100 feet long, 93 feet wide, 100 feet high, and is equipped with three 50-ton hoists with a hook height of 74 feet 10 inches. Movable side and front access platforms are included for accessing the Orbiter and equipment for jacking the Orbiter. The Orbiter lifting sling and adapters are also included.

Without the MDD's, the only other method of handling/lifting the Orbiter for mating to or from the 747 Shuttle Carrier Aircraft is rental of special heavy-lift (800-ton) mobile cranes at an estimated cost of $1 million each time (based on 1984 rental cost at Mobile and Dulles of $.5 million).

See Figure PPLR-24.

NO CHANGE TO ORBITER MATE/DEMATE DEVICE (MDD)

(NASA) (KSC) (DRYDEN)

DESCRIPTION: There are two MDD's; one located at the KSC Shuttle Landing Facility (SLF) and one at Edwards Air Force Base (Dryden). Both of these facilities are needed to support the STS program mission model and no changes are recommended. The MDD's are fixed, open-truss, steel structures with hoists and adapters capable of mating/demating the Orbiter to or from the 747 Shuttle Carrier Aircraft for transport from Dryden or other sites to KSC.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO MAJOR KSC ADMINISTRATIVE BUILDINGS

(NASA) (KSC)

The major KSC administrative facilities are required to support the mission model and include the following:

- Headquarters Building, M6-399: 404,736 square feet of administrative space.
- Base Operations Building, M6-339: 18,495 square feet of administrative space.
- Operations Support Building, K6-1096: 284,341 square feet of administrative space.
- CCAFS Engineering and Operations Building, 60650: 32,536 square feet of administrative space.

These four buildings provide a total of 740,108 square feet of administrative space.

The Engineering and Operations Building, 60650, will continue to house the KSC Expendable Launch Vehicle program personnel and is adjacent to the Shuttle SRB operations at Hangar AF, 66250. To the extent possible, KSC will consolidate personnel and functions, now in trailers and remote buildings, in the Engineering and Operations Building.

NO CHANGE TO MAJOR KSC ADMINISTRATIVE BUILDINGS

(NASA) (KSC)

DESCRIPTION: No change is recommended for the four major KSC administrative buildings. The buildings are the Headquarters Building and the Base Operations Building (KSC Industrial Area), the Operations Support Building (Vehicle Assembly Building Area), and the Engineering and Operations Building (Cape Canaveral Air Force Station Area). If housing requirements were to significantly decrease, KSC would consolidate personnel and functions now in modular buildings and in offsite leased space in these buildings and other existing buildings of permanent construction. These buildings are fully utilized and are required to support KSC's accomplishment of the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These buildings are required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE CANISTER ROTATION FACILITY (CRF)

(NASA) (KSC)

The Canister Rotation Facility (CRF) is located approximately 1/2 mile south of the Operations and Checkout (O&C) Building at KSC. The facility is used to rotate the payload canister between vertical and horizontal (or reverse) and set the canister on the transporter. The canister (and transporter) are more than 60 feet long and 15 feet wide.

The CRF crane is rated at a 100,000-pound capacity. The facility supports the mission model and no change is recommended.

NO CHANGE TO THE CANISTER ROTATION FACILITY (CRF)

(NASA) (KSC)

DESCRIPTION: The CRF is located in the NASA/KSC Industrial Area south of the NASA Headquarters Building. The facility has a large high bay with an overhead bridge crane and is used to rotate the payload canisters to and from vertical and horizontal orientations and place the canister back on the canister transporter. This facility is not fully utilized, but is required to support the STS mission model of 8 launches per year. No change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE CENTRAL INSTRUMENTATION FACILITY

(NASA) (KSC)

The Central Instrumentation Facility (CIF) provides computer support for the Kennedy Inventory Management Systems (KIMS), the Shuttle Tracking and Resources System (STARS), Configuration Management Data Systems (CMDS), and other STS processing and administrative systems. The Shuttle and Institutional Calibration Laboratories are housed in the CIF. The remainder of the Vehicle Assembly Building (VAB) Calibration Laboratory functions are now being relocated to the CIF. The TCMS B-1 set has been installed in the CIF and software is being installed in preparation for acceptance testing.

This facility is fully utilized by the above functions in support of the mission model.

NO CHANGE TO THE CENTRAL INSTRUMENTATION FACILITY

(NASA) (KSC)

DESCRIPTION: No change is recommended for the Central Instrumentation Facility (CIF). The CIF provides 122,571 square feet for precision equipment laboratories and supporting administrative space for institutional and Shuttle programs. This facility is fully utilized in support of the STS mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO MAJOR KSC WAREHOUSE FACILITIES

(NASA) (KSC)

The following major KSC warehouse facilities are fully utilized in support of the mission model:

Logistics Facility (Shuttle), K6-1547: 193,223 square feet of logistics space and 89,717 square feet of administrative space.

Central Supply Warehouse (Institutional), M6-744: 75,219 square feet of logistics space and 17,449 square feet of administrative space.

Supply Warehouse No. 1 (60% Institutional and 40% payloads), M6-794: 72,661 square feet of logistics space.

Supply Warehouse No. 2 (payloads), M6-698: 34,209 square feet of logistics space.

These four buildings provide a total of 375,312 square feet of logistics space and 107,166 square feet of supporting administrative logistics personnel space.

NO CHANGE TO MAJOR KSC WAREHOUSE FACILITIES

(NASA) (KSC)

DESCRIPTION: No change is recommended for the four major KSC warehouse facilities. The major KSC warehouse facilities are the Logistics Facility (Shuttle), Central Supply Warehouse (Institutional), Supply Warehouse No. 1 (Institutional and payloads), and Supply Warehouse No. 2 (payloads). These facilities are fully utilized for storage of STS vehicle and payload spare parts, KSC infrastructure spare parts, KSC Center shipping and receiving, and housing of logistics personnel. No changes are recommended to these facilities.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE - SHUTTLE CRAWLER TRANSPORTER (CT)

(NASA) (KSC)

The crawler transporter (CT) was originally built at KSC in the 1960's to transport the Apollo Saturn V moon rocket and mobile launcher to the launch pad. The CT was slightly modified for Shuttle. The crawler transporters (2 each) are an integral part of the LC-39 integrate, transport, and launch (ITL) concept for Shuttle vehicle processing and launch. The CT is capable of transporting a 12-million-pound Mobile Launcher from the VAB to the pad and return to the VAB on the LC-39 crawlerway. A crawler transporter moves a fully assembled Space Shuttle, mounted on a Mobile Launcher Platform, from the Vehicle Assembly Building to the launch pad. Without this facility, the Shuttle could not achieve its mission model of 8 launches per year.

The two crawlers are about 20 feet high, 131 feet long, and 114 feet wide. Each one weighs about 6 million pounds unloaded. A crawler has eight tracks, each of which has 57 shoes or cleats. Each shoe weighs approximately one ton. With the Space Shuttle aboard, the crawler can creep at a maximum speed of about 1 mile per hour; unloaded, it can manage about 2 miles per hour.

The crawler has a leveling system designed to keep the top of the Space Shuttle vertical while negotiating the 5-percent grade leading to the top of the launch pad. Also, a laser docking system provides almost pinpoint accuracy when the crawler and Mobile Launcher Platform are positioned at the launch pad or in the Vehicle Assembly Building.

Two 2,750-horsepower diesel engines power each crawler. The engines drive four 1,000-kilowatt generators, which provide electrical power to 16 traction motors. Operators in cabs on either end steer the giant vehicle.

The crawler transporter requires both scheduled and unscheduled maintenance and repair. Availability of two CT's is required to ensure the ability to achieve the mission model of 8 flights per year.

See Figure PPLR-25.

NO CHANGE - SHUTTLE CRAWLER TRANSPORTER (CT)

(NASA) (KSC)

DESCRIPTION: The crawler transporters (2 each) are an integral part of the LC-39 integrate, transport, and launch (ITL) concept for Shuttle vehicle processing and launch. The CT is capable of transporting an 11-million-pound Mobile Launcher with a fully assembled, unfueled Space Shuttle aboard from the VAB to and from the pad on the LC-39 crawlerway. Primary and backup crawler transporters are required to ensure availability and to achieve the STS mission model of 8 launches per year. No change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93**REV:** **CAT:** 1B

NO CHANGE TO ELECTROMAGNETIC LABORATORY

(NASA) (KSC)

The Electromagnetic Laboratory, M6-336, is required to support the mission model and houses the following functions:

- RF Range monitoring.
- Checking for electromagnetic interference (EMI).
- Verifying the quality of selected launch and checkout of RF channels.
- Two frequency control analysis (FCA) vans operate out of this facility.
- Provides a limited testing capability for the KSC Lightning Detection and Ranging (LDAR) system and Wind Profile (above 3,000 feet) system.

The RF testing performed in this facility supports all programs.

See Figure PPLR-26.

NO CHANGE TO ELECTROMAGNETIC LABORATORY

(NASA) (KSC)

DESCRIPTION: No change is recommended for the Electromagnetic Laboratory (KSC Industrial Area). The Electromagnetic Laboratory, with a net area of 8,192 square feet, provides for range RF monitoring to verify the quality of selected launch and checkout of RF channels and for performing RF testing, including equipment compatibility. This facility is required to support KSC's accomplishment of the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO ENGINEERING DEVELOPMENT LABORATORY

(NASA) (KSC)

The Engineering Development Laboratory, M7-409, is required to support the mission model and houses the following laboratories:

- Navigational Aids - Shuttle program.
- Transducers - Shuttle and Space Station programs.
- Hazardous Gas Detection - Shuttle program.
- Computer Software Development - Space Station program.
- Electronic Hardware Development - Space Station program.
- Optical Instrumentation - Shuttle and Space Station programs.

This building also provides the supporting administrative space for these functions.

See Figure PPLR-27.

NO CHANGE TO ENGINEERING DEVELOPMENT LABORATORY

(NASA) (KSC)

DESCRIPTION: No change is recommended for the Engineering Development Laboratory. This facility provides 64,044 square feet for precision equipment laboratories and supporting administrative space for the Shuttle and Space Station programs. This facility is fully utilized in support of the STS mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE VEHICLE ASSEMBLY BUILDING (VAB)

(NASA) (KSC)

The Vehicle Assembly Building (VAB) located in the Launch Complex 39 (LC-39) area of the Kennedy Space Center is capable of supporting the receiving, assembly, integration, test, and checkout of the Space Shuttle elements. It is an integral part of the LC-39 integrate, transport, and launch (ITL) concept for Shuttle processing and launch. The VAB also provides external tank (ET) and Orbiter main engine storage, test, and checkout capabilities. Each VAB integration cell is capable of supporting 7 Shuttle launches per year. The VAB covers an area of about 8 acres and has a volume of 129,482,000 cubic feet. It is 525 feet tall, 715 feet long, and 518 feet wide. The structures can withstand winds up to 125 miles per hour. The foundation rests on more than 4,200 steel pipe pilings, each 16 inches in diameter and driven down to bedrock at a depth of 160 feet. The Low Bay is 210 feet tall and contains the Shuttle main engine maintenance shop and serves as a holding area for SRB forward assemblies and aft skirts. Facing east are High Bays 1 and 3 where SRB stacking, ET/SRB Mate and Orbiter/ET Mate occurs in a vertical position on the Mobile Launcher Platform. Facing west are High Bays 2 and 4 where ET checkout and storage takes place. Each open VAB high bay is situated between an office tower. There are three towers on the east side and three towers on the west side. Since the VAB is a hazardous facility due to the presence of solid rocket motor segments, these office towers are unoccupied. The VAB has more than 70 lifting devices, including two 250-ton bridge cranes. Two new 325-ton bridge cranes are in the process of being installed to replace the 250-ton cranes. The low bay has a 175-ton bridge crane that traverses the length of the transfer aisle through the low bay and high bay. Each high bay door is 465 square feet from ground to top. The lower door is 192 feet wide and 114 feet high, and the upper door is 342 feet high and 76 feet wide. The north VAB door is 55 x 55 and the south VAB door is 55 x 95. Located immediately west of the VAB is the 29,000-square-foot Utility Annex/K6-947, which provides utility support to the VAB.

The VAB is the only existing facility capable of Shuttle assembly and is required to achieve the required 8 Shuttle flights per year mission model.

See Figure PPLR-28.

NO CHANGE TO THE VEHICLE ASSEMBLY BUILDING (VAB)

(NASA) (KSC)

DESCRIPTION: The Vehicle Assembly Building (VAB) located in the Launch Complex 39 area consists of a high bay area with two assembly bays separated by high bay towers on each side of a transfer aisle that extends through its center and connects to the low bay transfer aisle. The high bay is used for SRB stacking, external tank (ET) processing, and mate to the SRB's, and Orbiter mate to the ET. The low bay, which consists of a total of 8 cells (4 on each side of the transfer aisle) is used to house the SSME Engine Maintenance Shop, the extended duration Orbiter pallet processing area, and storage areas. The VAB is the only existing facility available for Shuttle assembly. The facility is not fully utilized; however, safety constraints prevent full utilization and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO SHUTTLE HYPERGOL MAINTENANCE FACILITIES (HMF)

(NASA) (KSC)

The Hypergol Maintenance Facility (HMF) complex comprises a group of buildings in the KSC Industrial Area approximately 8 miles southeast of the Vehicle Assembly Building. The HMF provides all the facilities required to process and store hypergol-fueled modules that are periodically removed from the Orbiters for maintenance and modification activities. The Hypergol Module Processing North Building/M7-961 is a 10,307-square-foot building in which the east cell is used to perform maintenance on the right-hand OMS Pod, the west cell is used for left-hand OMS Pod maintenance, and the support area in between provides power and launch processing system equipment interface. The Hypergol Support Building/M7-1061 is a 17,295-square-foot building which houses support personnel and LPS consoles to provide monitoring and control of all HMF functions. These consoles interface with the LPS Central Data Subsystem in the Launch Control Center/K6-900 and with the hardware interface modules in Buildings M7-961 and M7-1212. The Hypergol Module Processing South Building/M7-1212 is a 6,549-square-foot building in which maintenance is performed on the Forward Reaction Control System module in the west high bay, and the east high bay is used for storage of OMS Pods/FRCS modules awaiting availability of a checkout cell or return to the Orbiter Processing Facility. A support area is located in between the two high bays which provides power equipment, LPS interface, and a work shop area which supports the adjacent FRCS maintenance and checkout operations.

The HMF complex is the only existing facility capable of performing periodic Shuttle OMS Pod and FRCS maintenance and detailed checkout operations. The facility is fully utilized in support of the 8 Shuttle flights per year requirement in the mission model. Therefore, no changes are recommended for this facility.

See Figure PPLR-29.

NO CHANGE TO SHUTTLE HYPERGOL MAINTENANCE FACILITIES (HMF)

(NASA) (KSC)

DESCRIPTION: The Hypergol Maintenance Facility (HMF) comprises a group of buildings in the KSC Industrial Area which are used to perform periodic maintenance and detailed checkout requirements on the Orbital Maneuvering Subsystem (OMS) and Forward Reaction Control Subsystem (FRCS) removed from an Orbiter while undergoing processing in the Orbiter Processing Facility. The HMF is the only existing facility configured with unique GSE capable of performing OMS Pod and FRCS periodic maintenance requirements and is necessary to achieve the 8 Shuttle flights per year. These facilities are fully utilized in support of the STS program and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to support the mission model.

DATE: 12/6/93 **REV:** **CAT** 1B

NO CHANGE - SHUTTLE LAUNCH EQUIPMENT SHOP (LES)

(NASA) (KSC)

The LES was originally constructed at KSC in the 1960's to support repair and maintenance of the LC-39 complex for the Apollo Saturn V Moon program and was not modified for Shuttle. The facility is capable of limited onsite fabrication and repair of LC-39 facilities, systems, and equipment. The 36,000 square feet of building area provides a machine shop, welding shop, sheet metal shop, cable shop, pneumatics shop, logistics area, and painting and office areas that house 120 shop personnel. Without this facility, the STS program would be subject to increased repair operations cost and response times. Closure of this facility would violate the "self-sufficiency" concept of the SPC.

The LES is not fully utilized in supporting the projected Space Shuttle mission model of 8 launches per year due to budget constraints and, as a result, the LES carries a heavy workload backlog.

Similar shops exist at KSC (e.g., prototype, BOC, PGOC, and CCAFS). These other shops do not have the required fabrication capabilities and are understaffed to absorb the LES workload and backlog.

No change to the Launch Equipment Shop is recommended in order to minimize Shuttle operations cost and maximize efficiency.

See Figure PPLR-30.

NO CHANGE - SHUTTLE LAUNCH EQUIPMENT SHOP (LES)

(NASA) (KSC)

DESCRIPTION: This facility is capable of limited onsite fabrication and repair of LC-39 facilities, systems, and equipment. The 36,000 square feet of building area provides a machine shop, welding shop, sheet metal shop, cable shop, pneumatics shop, logistics area, and painting and office areas that house 120 shop personnel. This facility is fully utilized on a first-shift operation. Budget constraints limit second-shift utilization. Without this facility, the STS program would be subjected to increased operational costs and time delays, which could impair the ability to meet the STS mission model. Closure of this facility would violate the "self sufficiency" concept of the Shuttle Processing Contract.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE SHUTTLE LAUNCH CONTROL CENTER (LCC)

(NASA) (KSC)

The Launch Control Center (LCC) is a four-story building connected to the east side of the Vehicle Assembly Building by an elevated, enclosed bridge. The LCC is 77 feet high, 378 feet long, and 181 feet wide.

The first floor of the LCC is used for administrative activities and houses the Launch Complex 39 area utilities system control room (1P9) and the Fire and Rescue Center (room 1P10). The second floor is occupied by the LPS Central Data Subsystem, which consists of large scale computers which store such data as test procedures, vehicle processing data, master program library, historical data, pre- and post-test data analyses, as well as other essential information for launch operations. The third floor is occupied by the four firing rooms and adjacent engineering support areas. Each firing room is equipped with the Launch Processing System (LPS) which monitors and controls most Shuttle assembly, checkout, and launch operations. The fourth floor houses offices for Launch Control personnel.

The LCC is capable of supporting the simultaneous power-on processing operations of three Orbiters in flow from FR's 1, 3, and 4. Firing room 2 can either be used to support Shuttle software development or Orbiter power-on operations while an Orbiter is being processed in one of the three Orbiter Processing Facility bays.

To achieve 8 Shuttle flights per year requires the simultaneous processing of four Orbiters, three of which are usually undergoing power-on processing operations while the fourth Orbiter is undergoing structural inspection and modifications during its Orbiter Maintenance Down Period (OMDP). Each Orbiter takes approximately 126 calendar days to process from landing after its previous mission until its next launch. During an OMDP, an Orbiter's processing time in its OPF bay increases from 87 to 232 calendar days and includes approximately 95 days when an Orbiter is power down and does not require firing room support. During this period of time, the fourth firing room is used to support Shuttle software development and validation. Since this facility is fully utilized to support the STS mission model, no changes are recommended.

See Figure PPLR-31.

NO CHANGE TO THE SHUTTLE LAUNCH CONTROL CENTER (LCC)

(NASA) (KSC)

DESCRIPTION: The Launch Control Center (LCC) is a four-story building located next to the Vehicle Assembly Building that contains the control rooms and supporting areas that are used to monitor and control Shuttle element assembly, checkout, and launch operations. The LCC contains four firing (control) rooms, of which FR's 1, 3, and 4 are capable of supporting power on processing of three Orbiters simultaneously and FR 4 can either be used to support Shuttle software development or Orbiter power on operations. Since each Orbiter requires a firing room to support power-on processing operations, all four firing rooms are required to achieve the required 8 Shuttle flights per year. This facility is fully utilized in support of the STS program and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

P1/WP51/STENNIS.1B

NO CHANGE - SHUTTLE MOBILE LAUNCHER PLATFORM (MLP)

(NASA) (KSC)

The Mobile Launcher was originally constructed at KSC in the 1960's to support the launch preparations of the Apollo Saturn V moon rocket and was modified to the MLP configuration for Shuttle. Each of the three MLP's is capable of supporting the assembly, test, checkout, transporting, servicing, and launch of the Space Shuttle. Each MLP is an integral part of the LC-39 integrate, transport, and launch (ITL) concept for launch vehicle processing and launch. The MLP is a transportable launch base for the Space Shuttle. Each MLP provides access to and structural support for the Shuttle solid rocket boosters (SRB's) and access to the main engines of the Orbiter. The MLP provides umbilicals to the Shuttle that provide propellant servicing (LOX and LH_2) to the Orbiter and hypergol servicing to the SRB's.

Each Mobile Launcher Platform is a two-story steel structure which provides a transportable launch base for the Space Shuttle. The main body of each Platform is 25 feet high, 160 feet long, and 135 feet wide. The Mobile Launcher Platforms rest on six pedestals 22 feet high. Unloaded, a Platform weighs about 8.23 million pounds. With an unfueled Shuttle aboard, it weighs about 11 million pounds.

The MLP requires inspection, maintenance, corrosion control, and periodic repair after each launch. The availability of three MLP's is required to achieve the mission model of 8 flights per year.

See Figure PPLR-32.

NO CHANGE - SHUTTLE MOBILE LAUNCHER PLATFORM (MLP)

(NASA) (KSC)

DESCRIPTION: Each of the three MLP's is capable of supporting the assembly, test, checkout, transporting, servicing, and launch of the Space Shuttle. Each MLP is an integral part of the LC-39 integrate, transport, and launch (ITL) concept for launch vehicle processing and launch. Each MLP is theoretically capable of supporting 3 launches per year. The MLP is a two-story steel structure which provides a transportable launch base for the Space Shuttle. Each MLP provides the umbilicals required services and prepares the Shuttle for launch. These structures are fully utilized to achieve the Shuttle mission model of 8 launches per year.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE ORBITER PROCESSING FACILITIES (OPF's)

(NASA) (KSC)

The Orbiter Processing Facilities (OPF's) consist of three bays, of which Bays 1 and 2 are located in one building (K6-894) near the west side of the Vehicle Assembly Building (VAB) and Bay 3 (K6-696) is located northwest of the VAB. The OPF Bay 1 and 2 building consists of two identical bays, which are each 197 ft. long, 150 ft. wide, and 95 ft. high; have an area of 29,000 sq. ft.; and are equipped with two 30-ton bridge cranes with a hook height of approximately 66 ft. A low bay separating the two bays is 233 ft. long, 97 ft. wide, and 24.6 ft. high. A 10,000-sq.-ft. annex is located on the north side of the facility. Another 34,000 sq. ft., three-story annex provides additional office space.

OPF Bay 3 is a 50,000 sq. ft. facility which consists of a single high bay identical to OPF Bays 1 and 2. It also has a two-story low bay. Bay 3 is 197 ft. long, 150 ft. wide, and 95 ft. high; has an area of 29,000 sq. ft.; and is equipped with two 30-ton bridge cranes with a hook height of approximately 66 feet.

In each high bay, a trench system under the floor contains electrical, electronic, communication, instrumentation, and control cabling; hydraulic supply and return plumbing; gaseous nitrogen, oxygen, and helium plumbing; and compressed air distribution plumbing. Gaseous nitrogen, helium, and compressed air are supplied by the systems in the VAB. All of these systems are used to support processing and maintenance of the Orbiters during ground turnaround operations.

Each high bay has two large rolling bridges which span the main access bridge to provide complete access to installed payloads, radiators, internal areas of the payload bay, and external areas of the payload bay doors. Each of the rolling bridges supports two independently movable trucks with a personnel bucket at the bottom of each vertically telescoping arm. The buckets are manually rotatable around a full circle. Flip-up work platforms parallel the payload bay area to provide access to radiators, the inside payload bay doors, payload bay door hinges, and trunnion points. Other platforms provide access to other Orbiter elements. Each OPF bay is utilized for approximately 95 days per flow for Shuttle processing, excluding OMDP times and assuming success oriented and resource leveled. Thus, each OPF can theoretically support about 3.7 flights per year, excluding OMDP requirements. With the exclusion of one Orbiter in a 220-day OMDP period each year, the three OPF's together achieve the required 8 flights per year.

Supporting facilities include:

K6-0894A/Environmental Control System Building (East) (1390 sq. ft.)
K6-0894B/Environmental Control System Building (West) (1390 sq. ft.)
K6-0894D/OPF/GSE Storage Building (4031 sq. ft.)
K6-0894F/Hazardous Waste Staging Building (145 sq. ft.)
K6-0895/Pump House (3201 sq. ft.)

See Figure PPLR-33.

NO CHANGE TO THE ORBITER PROCESSING FACILITIES (OPF's)

(NASA) (KSC)

DESCRIPTION: The Orbiter Processing Facilities consist of several buildings in which Bays 1 and 2, a low bay and an annex, are contained in one building and Bay 3 and a low bay are contained in another nearby building. Each bay is used to process the Shuttle Orbiter from post-landing until ready for assembly in the Vehicle Assembly Building. Each OPF bay is theoretically capable of supporting 3.75 launches per year. This rate is reduced when the Orbiter maintenance down period is included. No change is recommended because the three OPF bays are fully utilized and are required to achieve the 8 Shuttle flights per year mission model, plus Orbiter modifications as required by the Shuttle program.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE ORBITER TRANSPORTER

(NASA) (KSC)

The Orbiter transporter (originally acquired for VAFB) provides a better method of moving the Orbiter from the Orbiter Processing Facility (OPF) to the Vehicle Assembly Building (VAB) for stacking operations.

The Orbiter transporter is a self-propelled, elevating-bed vehicle 106 feet 5 inches long with a maximum width of 20 feet and a variable bed height of 5 feet 2 inches to 7 feet 2 inches. It is powered by a diesel engine which drives hydraulic pumps that furnish hydraulic fluid to propel, steer, and elevate the vehicle. It can transport on paved roads a 200,000-pound Orbiter with a 65,000-pound payload on up to 6% grades. It has the ability to drive under an Orbiter and self-load it. The transporter weighs approximately 180,000 pounds and is supported on 76 wheels that are connected to a load distribution system to make it compatible with California road/bridge codes.

Without the use of this transporter the Orbiter would require towing with conventional aircraft tow tractors increasing potential oleo (landing gear) damage. Additionally, time lines have been reduced and safety enhanced by eliminating Orbiter gear retract and stow in the VAB transfer aisle.

See Figure PPLR-34.

NO CHANGE TO THE ORBITER TRANSPORTER

(NASA) (KSC)

DESCRIPTION: The Orbiter transporter is used to move an Orbiter from the Orbiter Processing Facility (OPF) to the Vehicle Assembly Building (VAB) during Shuttle stacking/buildup. The transporter will be retained as it reduces Orbiter handling and process flow time by allowing earlier closeout of Orbiter tasks and reducing the risk of Orbiter damage during transport. The transporter is an over-the-road, self-propelled, elevating-bed vehicle capable of handling a 200,000-pound Orbiter with a 65,000-pound payload.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE - SHUTTLE ORDNANCE STORAGE FACILITY

(NASA) (KSC)

The Shuttle Ordnance Storage Facility was originally constructed at KSC in the 1960's to support ordnance storage and operations of the Apollo Saturn V Moon Rocket. The facility contains six ordnance storage magazines, an ordnance laboratory, and an operations building containing a total of 11,000 square feet. The facility is capable of the receiving, inspection, storage, and nondestructive test of all types of ordnance devices used in support of the Space Shuttle program. Similar ordnance storage facilities exist on the Cape Canaveral Air Force Station (CCAFS). The CCAFS facilities support Delta, Atlas, and Titan launch vehicle programs.

There is insufficient storage space at the CCAFS facilities to accommodate the Space Shuttle ordnance requirements and the Delta, Atlas, and Titan programs simultaneously. If the facility were closed, the Space Shuttle program could not meet the mission model of 8 launches per year. Transferring ordnance storage operations to another facility, if one were available, would also violate the "self-sufficiency" concept of the Shuttle Processing Contract (SPC).

See Figure PPLR-35.

NO CHANGE - SHUTTLE ORDNANCE STORAGE FACILITY

(NASA) (KSC)

DESCRIPTION: This facility contains six ordnance storage magazines, an ordnance laboratory, and operations building containing a total of 11,000 square feet. The facility is capable of the receiving, inspection, storage, and nondestructive test of ordnance devices used in support of the Space Shuttle program. This facility is fully utilized to meet the STS mission model and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE PAYLOAD SHIPPING CONTAINER (HUBBLE)

(NASA) (KSC)

The Hubble shipping container is presently planned to be used for shipment of Space Station elements from MSFC to KSC.

The shipping container is used to transport horizontal payloads by water or land. It provides an environmentally controlled cleanliness level of 100,000 class, temperature is kept at 70 ° ±20 ° and relative humidity between 0 to 50%. Payloads up to 48 feet long, 15 feet in diameter, and 65,000 pounds can be accommodated. The container is 20 feet wide, 72 feet long, 18 feet high, and weighs 100,000 pounds.

The use of this shipping container reduces the cost of the Space Station program.

See Figure PPLR-36.

NO CHANGE TO THE PAYLOAD SHIPPING CONTAINER (HUBBLE)

(NASA) (KSC)

DESCRIPTION: The Hubble shipping container was designed and built to transport the Hubble telescope by land or water and should be retained for shipment of future payloads. It is presently located at MSFC and is being considered for shipping some Space Station elements to KSC. The shipping container can accommodate payloads up to 48 feet long and 15 feet in diameter weighing up to 65,000 pounds. The future use of this container supports the mission model and no changes are recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE PAYLOAD (P/L) CANISTER

(NASA) (KSC)

The payload canisters are used to transport Shuttle payloads while in a horizontal or vertical orientation. They provides an environmentally controlled cleanliness level of 100,000 class, temperaZture is kept at 70 ° ±5 °, and relative humidity between 30 to 50%. Payloads up to 60 feet long, 15 feet in diameter, and 65,000 pounds can be accommodated.

Both canisters are required to support the mission model. Each canister's interior resembles the Orbiter payload bay and is equipped with longeron and keel fittings to accommodate securing of the payload. For each new payload, these fittings must be repositioned and required instrumentation and monitoring systems reconfigured. Additionally, the canisters must be cleaned, inspected, repaired, and maintained. One canister alone would not support the mission model.

The canister is 65 feet long, 22 feet wide, 23 feet high in the horizontal attitude, and weighs 107,000 pounds.

See Figure PPLR-37.

NO CHANGE TO THE PAYLOAD (P/L) CANISTER

(NASA) (KSC)

DESCRIPTION: The Payload Canister is approximately 65 feet long, 17 feet in diameter, and is an environmentally controlled container with 60-foot long, 15-foot wide clam shell doors. There are two P/L canisters which are moved by means of equally long and wide multi-wheeled, motorized transporters. These canisters are used to transport large Shuttle payloads between the Vertical Processing Facility (VPF), the Operations and Checkout (O&C) Building, the Orbiter Processing Facility (OPF), and the Launch Complex 39, Pads A and B. No change is recommended by the team.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE PAYLOAD SUPPORT BUILDING (PSB)

(NASA) (KSC)

The Payload Support Building (PSB) is located east of the KSC Headquarters Building, immediately south of the Operations and Checkout (O&C) Building. The PSB is a large, multi-use building consisting of shops, laboratories, machine shops, battery lab, and other support functions required for processing payloads through the O&C Building. This is a very high-use building. It is an integral part of the payload processing at KSC and no change is recommended.

NO CHANGE TO THE PAYLOAD SUPPORT BUILDING (PSB)

(NASA) (KSC)

DESCRIPTION: The PSB (M7-505) is a large, TT-shaped, one-story building immediately south of the Operations and Checkout (O&C) Building (in the KSC Industrial Area). Many KSC payload processing and storage support functions are housed in this facility. This facility is fully utilized in support of the mission model and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE PROCESSING CONTROL CENTER (PCC)

(NASA) (KSC)

The Processing Control Center is a three-story, 240-foot by 135-foot building located west of the VAB within the LC-39 area of KSC. The first floor consists of 31,920 square feet of area for the Intermediate Level Maintenance Facility (ILMF) which is occupied by personnel who perform maintenance on Checkout, Control and Monitor Subsystem (CCMS) Line Replaceable Units. The second floor is office area occupied by Launch Processing System Engineering and support personnel. The third floor contains two processing control rooms. PCC-1 contains CCMS hardware/software consoles linked to Orbiter Processing Facility Bays 1, 2, and 3, which will be used during the CCMS I and CCMS II transition to control and monitor Orbiter processing in support of a specific mission. PCC-1 also contains the Application Software Development Facility and Photo console. PCC-2 provides the capability for CCMS software validation and will eventually contain the Software Production Facility. PCC-2 also contains the tape library.

During the CCMS I to CCMS II transition period currently planned from 1994-1998, each of the control rooms in the Launch Control Center will be taken out of service one at a time and upgraded to CCMS II configuration. The PCC will be used for initial CCMS II integration and testing and will provide control room capability as each LCC control room is upgraded.

The PCC is required to achieve the required 8 Shuttle flights per year mission model.

See Figure PPLR-38.

NO CHANGE TO THE PROCESSING CONTROL CENTER (PCC)

(NASA) (KSC)

DESCRIPTION: The Processing Control Center contains a processing control room (PCC-1) which provides capability to perform Orbiter power-on test and checkout operations while an Orbiter is in OPF bays 1, 2, or 3. PCC-2 provides capability for application software development. The building also contains the intermediate level maintenance facility for repair of LPS/CCMS line replacement units. The PCC will be used for initial CCMS II integration and testing and will provide control room capability as each LCC control room is upgraded. The PCC is required to achieve the 8 Shuttle flights per year. This facility is fully utilized in support of the STS program and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE SRB PROCESSING AND SEGMENT STORAGE FACILITY

(NASA) (KSC)

The SRB Processing and Segment Storage Facility is located north of the Vehicle Assembly Building (VAB) in the Launch Complex 39 (LC-39) area and comprises the following facilities:

K6-0494 - SRM Rotation and Processing Facility - 18,800 square feet for processing
K6-0445 - Contractor Support Building - 986 square feet for temporary staging of hazardous waste materials
K6-0495 - Support Building - 2,865 square feet for offices
K6-0497 - Surge Building #1 - 5,704 square feet for SRM staging
K6-0345 - Surge Building #2 - 5,704 square feet for SRM staging
K6-0446 - Shop/Storage Building - 5,640 square feet for storage

These facilities isolate hazardous operations associated with solid rocket motor rotation and processing. The Rotation and Processing Building has an area of 18,800 square feet and is used for solid motor receiving, rotation, and inspection and supports aft booster buildup. Rail tracks within the building permit railroad cars containing the segments to be positioned directly under one of the two 200-ton overhead bridge cranes. Handling slings are then attached to the railcar cover, and it is removed. The segment is inspected while it remains in the horizontal position.

The two overhead cranes hoist the segment, rotate it to the vertical position, and place it on a fixed stand. The aft handling ring is then removed. The segment is hoisted again and lowered onto a transportation and storage pallet, and the forward handling ring is removed to allow inspections. It is then transported to one of the surge buildings and temporarily stored until it is needed for booster stacking in the VAB.

Two surge buildings located nearby contain 6,000 square feet each of floor area for storage of eight SRM segments (one flight set) between the time they are offloaded from railcars in the rotation building and the time they are scheduled to be transported to the VAB for stacking. The buildings are 61 feet in height in the aft segment storage area and 43 feet in the forward and center segment storage area.

This facility is the only existing facility capable of offloading, processing, and preparing SRM segments for stacking and is necessary to achieve the 8 Shuttle flights per year mission model.

See Figure PPLR-39.

NO CHANGE TO THE SRB PROCESSING AND SEGMENT STORAGE FACILITY

(NASA) (KSC)

DESCRIPTION: The SRB Processing and Segment Storage Facility comprises a group of buildings in the Launch Complex 39 (LC-39) area north of the Vehicle Assembly Building (VAB) which are used to offload, rotate, and inspect each SRM segment arriving from Utah on rail cars for processing in support of a specific STS launch. Each segment is placed vertically on a transportation pallet and taken to one of two surge buildings until it is required in the VAB for stacking onto a Mobile Launcher Platform. Since the RPSF is fully utilized and is the only existing group of facilities capable of processing SRM segments from arrival until stacking, no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

P1/WP51/STENNIS.1B

NO CHANGE TO THE SRM TRANSPORTERS

(NASA) (KSC)

The SRM transporters are self-propelled, elevating-bed vehicles, 51 feet long, 20 feet wide, with a variable bed height of 5 feet 2 inches to 7 feet 2 inches. Each is powered by a diesel engine which drives hydraulic pumps that furnish hydraulic fluid to propel, steer, and elevate the vehicles. Each transporter weighs approximately 180,000 pounds and is supported on 48 wheels that are connected to a load distribution system to make it compatible with an H20 roadway. Each transporter is capable of carrying one SRM segment on its pallet or a distributed load of 400,000 pounds.

Both transporters are required to support the mission model. They are used to move incoming solid rocket motors (SRM's) to storage and stored SRM's to the processing facility as well as processed SRM's to the Vehicle Assembly Building (VAB) for SRB buildup/stacking on the MLP. During down times, the transporters are maintained and checked out. Unscheduled down times may increase as these transporters get older (now 10 years old).

See Figure PPLR-40.

NO CHANGE TO THE SRM TRANSPORTERS

(NASA) (KSC)

DESCRIPTION: There are two solid rocket motor (SRM) transporters located at KSC used to transport SRM segments from the SRM Storage and Processing Facility to the Vehicle Assembly Building for stacking/buildup of the solid rocket boosters (SRB's) on the mobile launcher. Both transporters are fully utilized and are required to support the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE VERTICAL PROCESSING FACILITY (VPF)

(NASA) (KSC)

The Vertical Processing Facility (VPF) is located in the KSC Industrial Area. The facility contains approximately 13,000 square feet of usable floor space consisting of an environmentally controlled high bay, an air lock, and single-story support structures attached directly to the sides of the high bay.

Functionally, the building is divided into the following areas: a clean work area complex consisting of an air lock and a high bay, mechanical equipment, and electrical rooms; a cargo integration test equipment (CITE) T-0 ground support equipment (GSE) interface room; and other support rooms.

The air lock is located at the south end of the facility. It is approximately 42 feet wide by 75 feet long and provides a usable floor area of 3,150 square feet. The air lock has a clear ceiling height of 74 feet 7 inches. Outside access into the air lock is by means of a 24-foot 9 inch-wide by 71-foot 1/8-inch high rolling equipment door. A vertical leaf door, 38 feet wide by 71 feet 4-1/2 inch high , provides access between the air lock and the high bay. The interior walls are gypsum wallboard and the ceiling surface is plastic-faced acoustic tile. The concrete floor is coated with white water-base epoxy paint.

High Bay and Test Cells. The high bay is 75 feet wide by 150 feet long, and has 11,250 square feet of floor space. It has a ceiling height of 105 feet, restricted by the lower surface of the bridge crane (approximately 97 feet to the top of the bridge crane rail). Access for personnel and small equipment is through air showers.

Vertical payload processing in the VPF includes the integration of all payload elements assigned to a particular mission. Payload classifications processed in the VPF include deployables and nondeployables. The testing requirements imposed on the payload element are (1) requirements for ensuring safety, and (2) requirements for testing interfaces between the payload and Orbiter.

See Figure PPLR-41.

NO CHANGE TO THE VERTICAL PROCESSING FACILITY (VPF)

(NASA) (KSC)

DESCRIPTION: The VPF is a large, hazardous class 100,000 clean room payload processing and Orbiter online integration facility. All vertically processed large Orbiter payloads use this facility. This facility is not fully utilized and can handle additional payload integration tasks. No change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE THERMAL PROTECTION SYSTEM FACILITY
(NASA) (KSC)

The Thermal Protection System (TPS) facility is a two-story, 44,000-square-foot building located across the street from the Orbiter Processing Facility in the LC-39 area. It provides a unique capability at KSC to manufacture thermal tiles for the Space Shuttle Orbiter. The TPS facility is used to repair and manufacture the tiles, gap fillers, and insulation blankets that protect the exterior and payload bay interior of each Orbiter from the searing heat of launch and re-entry and the cold soak of space. These materials can sustain damage during a flight and must be inspected, repaired, or sometimes replaced for the next mission. The facility supports the processing of the four Shuttle Orbiters and is staffed for nearly around-the-clock operations. Average tile replacement for the past 10 Shuttle flights has been approximately 173 tiles per flow as shown by the following chart:

Reason Replaced	STS-46	STS-47	STS-52	STS-53	STS-54	STS-56	STS-55	STS-57	STS-51	STS-58	Average
	104/12	105/2	102/13	103/15	105/3	103/16	102/14	105/4	103/17	102/15	
Flight Damage/Loss	12	30	33	64	26	27	27	13	28	52	31
Engineering Change/ Modification	0	0	34	251	8	32	37	32	2	91	49
Ground Damage/ Error	17	1	38	34	7	26	28	7	84	26	27
Access & Engineer- ing Test/Evaluation	1	14	30	286	8	9	28	5	10	36	43
Replacement Tile/ Bond Problem	5	8	17	33	9	23	33	3	22	31	18
Drag Chute Deploy	-	6	6	-	6	6	6	6	6	6	6
Total	35	59	158	668	64	123	159	66	152	242	173

The TPS facility is the only existing facility which produces Shuttle TPS components and is required to achieve the 8 Shuttle flights per year mission model. See Figure PPLR-42.

NO CHANGE TO THE THERMAL PROTECTION SYSTEM FACILITY

(NASA) (KSC)

DESCRIPTION: The Thermal Protection System (TPS) facility provides the capability to manufacture or repair TPS tile and blankets required for the Shuttle Orbiters. The facility supports the three OPF bays and four Orbiters and is staffed for nearly around-the-clock operations. The TPS facility contains unique equipment to shape each of the multitude of different sized and contoured tiles. It is the only existing facility which produces Shuttle TPS components and is required to achieve the 8 Shuttle flights per year. This facility is fully utilized in support of the STS program and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE TURN BASIN

(NASA) (KSC)

The turn basin was originally constructed in support of the Saturn V Apollo program as a waterway terminal for receiving large booster stages. Today, this is the only available means of receiving the external tanks (ET's) from their fabrication facility at Michoud and is required to support the mission model.

The facility consists of one barge slip capable of accommodating the ET barge, along with associated mooring hardware. There is adequate space within the turn basin to maneuver the barge and tug(s) for positioning and removing the barge.

NO CHANGE TO THE TURN BASIN

(NASA) (KSC)

DESCRIPTION: The turn basin is located in the Launch Complex 39 (LC-39) operations area of KSC. It is essential in the support of the mission model as it is a vital transportation link for the STS external tank (ET). The ET's, manufactured at the Michoud Facility, are barged to KSC and offloaded at this facility. The turn basin provides a sheltered dockage facility for offloading the ET's.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO SPACECRAFT ASSEMBLY & ENCAPSULATION FACILITY #2 (SAEF-2)

(NASA) (KSC)

The SAEF-2 class 100,000 clean room facility is located in the Hypergol Maintenance Facility Area in the KSC Industrial Area. The facility is used for the assembly, test, encapsulation, ordnance work, propellant loading, and pressurization of spacecraft. It contains approximately 16,750 square feet of usable floor space. Construction is of reinforced concrete and concrete block. The high bay is a steel frame structure with insulated aluminum siding. The facility is structured as follows:

Airlock - 41 feet wide by 58 feet long by 52 feet high.
High Bay - 49 feet wide by 99 feet long by 74 feet high.
Low Bay (2 each) - 19 feet wide by 72 feet long by 25 feet high.
East Test Cell - 37 feet wide by 37 feet long by 52 feet high.
Orbiter Rooms and Trailers

SAEF-2 is a large, hazardous (hypergol and solid ordnance) satellite [spacecraft (S/C)] processing area for Shuttle and Expendable Launch Vehicle (Atlas, Delta, and Titan) payloads. NASA payloads are scheduled to process through SAEF-2 beyond the year 2000.

NO CHANGE TO SPACECRAFT ASSEMBLY & ENCAPSULATION FACILITY #2 (SAEF-2)

(NASA) (KSC)

DESCRIPTION: The Spacecraft Assembly and Encapsulation Facility #2 (SAEF-2) is a large Hazardous Processing Facility (HPF), class 100,000 clean room with an adjoining large airlock (A/L), a separate, smaller "E" test cell, office trailers, and separate control room building. NASA Shuttle Payload (P/L) and Expendable Launch Vehicle (ELV) P/L's will process through SAEF-2 beyond the year 2000. This facility is fully utilized to support the STS mission model and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 11/9/93 **REV:** 12/6/93 **CAT:** 1B

NO CHANGE TO THE PAYLOAD HAZARDOUS SERVICING FACILITY (PHSF)

(NASA) (KSC)

The PHSF complex is located just off E Avenue south of the Operations and Checkout Building in the KSC Industrial Area.

The PHSF is a steel frame building covered with insulated metal siding and contains an air lock and a service bay. The service bay meets the requirements of a level 4, class 100,000 clean work area (CWA), and the air lock meets a level 5, class 300,000 CWA. Connected to the southwest wall of the PHSF is a single-story concrete block structure containing the electrical/mechanical room, the utilities and operations control room, the equipment air lock, an air shower room, and other support rooms. A single-story concrete block communication room is connected to the PHSF on the north wall of the service bay.

The PHSF complex comprises three major structures as well as a fuel building and an oxidizer shed. The major structures are: the PHSF, containing a hazardous operations service bay and air lock; the Facility Control Building (FCB), containing offices, support rooms, and two payload control rooms; and a third structure which consists of a large covered open-sided shed used to store customer equipment such as large containers, shipping boxes, etc. An addition is being built next to the FCB to support the Payload Spin Test Facility-Replacement (PSTF-R) facility.

The PHSF and the FCB were constructed by NASA in 1987. It is the largest offline hazardous payload processing facility at KSC and CCAFS and can support canister loading and unloading operations.

See Figure PPLR-43.

NO CHANGE TO THE PAYLOAD HAZARDOUS SERVICING FACILITY (PHSF)

(NASA) (KSC)

DESCRIPTION: The Payload Hazardous Servicing Facility (PHSF) is located in the KSC Industrial Area. The PHSF facility consists of hypergol fuel servicing and oxidizer servicing areas, a very large, class 100,000 clean room high bay (hazardous; i.e., hypergol and solid ordnance) with an adjoining large airlock, a Facility Control Building (FCB), and a large, covered shed used to temporarily store/stage customer shipping containers. The PHSF is fully utilized to meet the mission model and no changes are recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE RADIOISOTOPE THERMAL GENERATOR (RTG) BUILDING

(NASA) (KSC)

The Radioisotope Thermal Generator (RTG) is located 500 feet east of the Vertical Processing Facility and is a fenced, 50-foot by 50-foot by 25-foot high, single-story building. This building is used for RTG processing for both Orbiter and Expendable Launch Vehicle (ELV) at KSC. When an RTG is not in flow, the building is used for temporary storage of payload customer ground support equipment.

The RTG supports the mission model and no change is recommended.

NO CHANGE TO THE RADIOISOTOPE THERMAL GENERATOR (RTG) BUILDING

(NASA) (KSC)

DESCRIPTION: The RTG Building is the only facility sited and approved for RTG processing and storing at KSC. This is a fenced, 50-foot by 50-foot, 25-foot tall, one-floor structure approximately 500 feet east of the Vertical Processing Facility at KSC. RTG payloads fly on Shuttle and Expendable Launch Vehicles, such as Titan. This facility is not fully utilized and could handle additional RTG payloads. No change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO HANGAR AE

(NASA/KSC) (CCAFS)

Hangar AE/60680 is on Hangar Road south of CCAFS Industry Road. The area is fenced and lighted and guarded by a roving guard at night, on weekends, and on holidays.

Hangar AE was acquired by NASA through a NASA/Department of Defense agreement. Extensive modifications have since expanded the payload checkout and test capabilities. The building has a rigid steel frame covered with corrugated aluminum and has overall dimensions of 120 feet by 320 feet. Two large antenna towers (one on the north side and one of the south side of the building) complete the facility.

This facility is generally used for prelaunch preparations and checkout of unmanned payloads. The building contains a class 10,000 to 50,000 high bay clean room complex, an unmanned vehicle telemetry ground station, the Mission Director's Center (MDC), and offices for payload management and contractor personnel. The KSC Payload Management and Operations Directorate uses this building as its "communications center." The entire building is environmentally controlled.

Hangar AE is functionally divided into four major areas: the north wing, the central frame low bay, the high bay clean room complex, and the south wing. Two concrete masonry block walls run the complete east-west length of the building to separate the north wing, central frame low bay, and the south wing. An extra wide, wooden-stud, gypsum-covered wall separates the high bay clean room complex from the remainder of the building.

Hangar AE supports all NASA Expendable Launch Vehicle boosters and payloads through testing and launch and is the ASTROTECH commercial processing facility payload ground station. The facility also supports many Shuttle payloads through launch and on orbit deployment. It supports the mission model and no change is recommended.

See Figure PPLR-44.

NO CHANGE TO HANGAR AE

(NASA/KSC) (CCAFS)

DESCRIPTION: Hangar AE is located at Cape Canaveral Air Force Station (CCAFS), Eastern Test Range (ETR), Florida. The hangar supports all NASA payloads (P/L) launched on Expendable Launch Vehicles (ELV's) (Delta, Atlas, and Titan) during processing and launch, as well as the ELV launch booster data itself. Hangar AE also supports many NASA P/L's on the Orbiter. It also supports the ASTROTECH commercial P/L processing in Titusville, Florida, through launch on an Orbiter or ELV. This facility is fully utilized to support the mission model and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE SOLID ROCKET BOOSTER (SRB) RECOVERY FACILITY/HANGAR AF

(NASA) (CCAFS)

The SRB Recovery Facility is required to receive and process spent SRB's for reuse in the STS program. It is required to support the mission model. The timely receiving and processing of this flight hardware is necessary to sustain the remanufacturing and supply to the launch site of solid rocket motors (SRM's) for future/downstream missions.

Hangar AF receives, disassembles, and cleans spent Shuttle solid rocket boosters in preparation for refurbishment and remanufacturing of SRM components. It consists of a retrieval slip for removing SRB casings from the water, a wash facility for cleaning and rinsing of expended SRB segments, a high bay for SRB disassembly, a high pressure wash facility for removal of TPS material from SRB components, an SRB paint facility, and facilities for berthing the two SRB recovery ships "RV Liberty" and RV Freedom."

See Figure PPLR-45.

NO CHANGE TO THE SOLID ROCKET BOOSTER (SRB) RECOVERY FACILITY/HANGAR AF

(NASA) (CCAFS)

DESCRIPTION: The Solid Rocket Booster (SRB) Recovery Facility, located at Hangar AF on Cape Canaveral Air Force Station (CCAFS), is operated by KSC. It serves as the receiving point for spent SRB's recovered after an STS launch and is required to support the mission model. The facility consists of slips and equipment for removal of the SRB from the water and provides for disassembly and cleaning of the solid rocket motor (SRM) casing prior to shipping it back to the remanufacturing facilities in Utah. This facility is fully utilized.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. The facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE SOLID ROCKET BOOSTER (SRB) RECOVERY SHIPS

(NASA) (CCAFS)

Both ships are required to support the mission model. Each ship recovers one SRB, along with the parachutes and frustrum. In the event one vessel is not available due to any extensive dry dock/repairs, then a smaller rental ship would be required to "station keep" one SRB at sea until the available ship could make its tow back and return for the other SRB. This could slow the flow of refurbished SRB's back into the system. Down times between STS missions are used to maintain the ships and the shipboard equipment.

Each ship is 176 feet long, with a 42-foot beam, and 12-foot draft, powered by twin 1500 HP engines. The ships are equipped with 500 HP bow thrusters and a "white gill" stern thruster. The ships' thrusters are used for close-in maneuvering and for traversing the river channel (a Manatee habitat) from Port Canaveral to Hangar AF. The ships are equipped with ship-to-shore communications, a Global Positioning System (GPS), galley, and freezer locker, decompression chamber, and crew quarters. They have a 2,000-mile range.

See Figure PPLR-45.

NO CHANGE TO THE SOLID ROCKET BOOSTER (SRB) RECOVERY SHIPS

NASA) (CCAFS)

DESCRIPTION: The two solid rocket booster (SRB) recovery ships operated by KSC are berthed at Hangar AF on Cape Canaveral Air Force Station (CCAFS). They support the mission model by recovering the spent SRB's after splash down in the Atlantic Ocean and towing them back to Hangar AF for reprocessing. Presently, these ships are not fully utilized.

The recovery ships (RV Liberty and RV Freedom) are of the "offshore" supply class vessel, each being 176 feet long, with a 42-foot beam, and a draft of 12 feet.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO HANGAR S

(NASA/AF) (CCAFS)

Hangar S/Facility No. 1726 is on Hangar Road south of CCAFS Industry Road. The hangar is a concrete and steel frame building with full-opening sliding doors on the east and west walls and consists of a main hangar building with two-story office and laboratory areas on the north and south sides. The main hangar contains two single-story substructures; a support building and a clean work area (CWA) complex. The support building is adjacent to the clean room complex and contains offices and storage space; however, this area is not normally available to customers. Single-story annexes are connected to the main hangar building on the north and south sides.

The nonhazardous clean room(s) operational areas of Hangar S include two class 100,000 high bay CWA's, an air lock, and two ground station areas. Equipment in the air lock and high bay CWA's can be handled with overhead cranes (a monorail crane in the air lock, a monorail crane in the north clean work area, a bridge crane in the south clean work area, and a bridge crane in the north ground station area).

C-3

Hangar S is generally used for prelaunch preparation and checkout of payloads for both Space Shuttle and Expendable Launch Vehicles. The north and south CWA's can be used individually or, if necessary, both bays may be used for one larger payload. Generally, simultaneous processing of two payloads is planned in the two sections. The major operational areas are the air lock and the CWA complex. The Hangar S equipment air lock (room 20) is common to the north and south clean work area complexes. The air lock is 19 feet 8 inches long by 16 feet 1 inch wide. Large equipment can enter the air lock through the 16-foot 1-inch wide by 20-foot 8-inch high door on the west; however, entry into either CWA is limited by the 14-foot 9-inch wide by 19-foot 8-1/2-inch high folding doors which provide entry into the CWA's. The ceiling height is 23 feet 6 inches.

The south section contains a CWA (room 15) and a ground station area. The south CWA has a usable floor space of 45 feet by 55 feet 3 inches, with a clear vertical height of 26 feet.

The north CWA has a usable floor space of 29 feet 11 inches by 42 feet, with a clear vertical height of 23 feet 6 inches. The construction is the same as that for the south CWA.

See Figure PPLR-46.

NO CHANGE TO HANGAR S

(NASA/AF) (CCAFS)

DESCRIPTION: Hangar S is presently used by several KSC organizations as well as the Air Force. The facility consists of a hangar with two clean rooms and three adjacent support buildings which contain office space and laboratories. These facilities are fully utilized for payload buildup and testing and no changes are recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO LAUNCH COMPLEX (CX) 20

(AIR FORCE/BMDO/USASSDC) (CCAFS)

This complex was used as late as 1965 to support Titan IIIA launches. The Titan launch structures have long since been removed . As recently as 1985 CX 20 was refurbished by USASSDC, in support of BMDO, to add one rail launcher and an additional flat pad area to support another rail launcher. Small launch equipment buildings were also constructed adjacent to both the rail launcher and flat pad area. Also as part of this refurbishment an existing small building located on the complex was renovated into a payload assembly building (with a clean room capability). This site can support the launch of rail launched suborbital expendable launch vehicles in its present configuration. The existing blockhouse is used as the launch control center.

Past BMDO launches supported by this complex since 1985 include Starbird (17 Dec 90), Red Tigress IA (20 Aug 91), Red Tigress IB (20 Oct 91), Red Tigress IIA (23 May 93), and Red Tigress IIB (28 May 93). and the Red Tigress program. Also, the commercial Joust program was supported from this launch facility (launched on 18 Jun 91).

There is currently no mission model requirement for this facility, however, the 45 SPW gets frequent inquiries from commercial launch operators interested in the capabilities of the launch complex in support of rail launched vehicles. USASSDC has provide funding for the O&M of the complex through the end of FY 94. In addition, BMDO/USASSDC are now evaluating the potential use of this complex in support of the Theater Missile Defense Critical Measurements Program (TCMP-2). This program was recently funded and is not contained in the mission model base lined for this study. Before moth-balling this facility 45 SPW and BMDO need to jointly review the cost considerations of such mission model excursions since it may be more costly to reactivate the complex from a moth-balled state to support near term programs than the savings may warrant.

If this complex was to be moth-balled in the future USASSDC would remove the launch rail and associated launch support equipment/computers and store for future use or relocate to a different site wherever they can be utilized. These equipment removal/storage costs are TBD but would likely outweigh any near term benefit that would be realized by placing this complex in a moth-balled mode. At this point it makes sense to leave these assets in place for potential shared use by Government/commercial programs.

See Figure PPLR-47.

FILE: CX20-1

NO CHANGE TO LAUNCH COMPLEX (CX) 20

(AIR FORCE/BMDO/USASSDC) (CCAFS)

DESCRIPTION: CX20 is currently in a stand-down mode. The US Army Space and Strategic Defense Command (USASSDC) is the Range User providing funding to 45 SPW for O&M of the complex. This site can presently support rail launched suborbital expendable launch vehicles and associated payload assembly. The last launch supported by this complex was Red Tigress II in 1993.
PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. Although this facility does not support the baseline mission model there is a near term DoD mission model excursion that warrants keeping this complex open through at least the end of FY 94 and potentially beyond.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 1B

FILE: CX20

NO CHANGE TO HANGAR L

(NASA/KSC) (CCAFS)

The Hangar L complex is located on Hangar Road and is the first hangar south of CCAFS Industry Road. Hangar L is the LSSF for the Space Shuttle payloads.

This concrete block and steel frame hangar with two-story structures connected at the north and south sides has overall dimensions of approximately 170 feet by 184 feet. First floor interior partitions are predominantly metal studs, lath, and concrete block covered with cement plaster. The second floor room partitions are constructed of metal studding covered with gypsum wallboard. The external doors are constructed of metal and glass (the sliding hangar doors on the east and west side), as are the animal holding room (AHR) doors. The doors of the laboratories and the special support rooms on the first and second floor (north side) are metal and the office area doors are constructed of wood. A paved parking area surrounds the building and the entire area is fenced.

The first floor of the north structure (northeast side of the building) contains seven AHR's and a clean and service corridor. The second floor of the north side contains a plant holding area, a plant lab, a tissue lab, and a computer room. The northern half of the central high bay contains laboratories, surgery/x-ray complex, sterilization areas, shower/locker rooms, animal/receiving area, cage wash and storage area, and an Experiments Monitoring Area (EMA). The southern half of the central high bay contains the Biomass Production Chamber, a secure storage area, an electronics shop, a mock-up and staging area, and laboratories. The second floor of the central high bay contains CELSS processing areas including a sterilization room, food processing area, and an organic analysis laboratory. Both floors of the south structure contain office space for facility personnel and a conference room on the first floor. Exterior to the building is an emergency generator (north side) and a biohazard incinerator.

The Hangar L annex is currently used as a prototype shop and fabrication area and provides storage for LSFE and CELSS equipment. The "L" annex consists of 5,000 square feet of floor space and measures 50 feet by 100 feet. The facility is also a concrete block structure. Additional laboratory and administration space to support the Plant Space Biology research program is located above the flight support area. The LSSF Modular Building located to the west of Hangar L provides 3,000 square feet of office space for visiting PI's/customers.

See Figure PPLR-48.

NO CHANGE TO HANGAR L

(NASA/KSC) (CCAFS)

DESCRIPTION: Hangar L - Life Science Support Facility (LSSF) is located at Cape Canaveral Air Force Station (CCAFS) on Hangar Row and supports all the Shuttle Life Science Flight Experiments (LSFE), Controlled Ecological Life Support System (CELSS), and plant space biology. Shuttle middeck and Space Lab experiments are also supported by the LSSF. This facility is fully utilized to meet the mission model and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO AUGMENTED EMERGENCY LANDING SITES (ELS's) HIGH AND LOW INCLINATION

(NASA, DOD, CIVIL, AND OTHER COUNTRIES)

Augmented ELS's are strategically located in Spain and Africa to afford a transatlantic abort landing (TAL) in the event the Orbiter does not reach orbit. Once on orbit, one of the TAL sites, along with one Pacific site, remains up and manned during the mission to afford an augmented site for emergency landing within three revolutions of the ground track. Three TAL sites will be manned prior to launch. Navigation/landing aids located at these sites include TACAN, MSBLS, PAPI lights ball/bar, APIL system, distance-to-go markers, and arresting barrier (SOAS). Ground and ground-to-air communications, fire, crash, rescue, and medical support is also provided.

High Inclination: Zaragoza, Spain, Runway (R/W) 30L - 12,190 feet long and 197 feet wide.

High Inclination: Hickam AFB, R/W 8R - 10,700 feet long and 200 feet wide.

High and Low Inclination: Moron, Spain, R/W 20 - 11,800 feet long and 200 feet wide.

High and Low Inclination: Ben Guerrir, Morocco, R/W 18/36 - 12,700 feet long and 200 feet wide.

Low Inclination: Yundum, Gambia, R/W 32 - 11,822 feet long and 197 feet wide.

Low Inclination: Andersen AFB, Guam, R/W 6L - 10,555 feet long and 200 feet wide.

These facilities provide added safety for the Orbiter and flight crew and are essential to launch. Mission safety rules require two of the three TAL sites to be up and available prior to launch.

No changes are recommended.

NO CHANGE TO AUGMENTED EMERGENCY LANDING SITES (ELS's) HIGH AND LOW INCLINATION

(NASA, DOD, CIVIL, AND OTHER COUNTRIES)

DESCRIPTION: Augmented ELS's provide safety margins for the Orbiter during the ascent to orbit and while on orbit. These are existing airfields located in Spain (Zaragoza and Moron), Africa (Ben Guerrir, Morocco, and Yundum, the Gambia), and the Pacific (Hickam and Andersen AFB). These are existing airfields with minimum required runway lengths and have been augmented with special Orbiter navigational and landing aids. These facilities are considered the minimum necessary to provide augmented emergency support to the Orbiter and no change is recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE VAFB DELTA LAUNCH AND LAUNCH SUPPORT FACILITIES, SPACE LAUNCH COMPLEX-2 (SLC-2)

(NASA/AIR FORCE) (VAFB)

The Delta facilities provide the capability for checkout, servicing, and launch of the Delta II vehicle. The facilities consist of the following buildings:

- Delta Launch Pad/1623
- Delta Launch Control Center/1622
- Delta SRM Processing/1670
- Delta Technical Shops/1615/1618/1621/1629/1632
- Delta Administrative/1628

The complex also contains storage tanks for LOX, RP-1, LN_2, N_2O_4, A50, HE, GN_2, and H_2O. An upgrade of the launch pad to accommodate the Delta II vehicle is presently being completed.

All of these facilities are required to support the mission model projection of 54 west coast launches through FY 2023.

NO CHANGE TO THE VAFB DELTA LAUNCH AND LAUNCH SUPPORT FACILITIES, SPACE LAUNCH COMPLEX-2 (SLC-2)

(NASA/AIR FORCE) (VAFB)

DESCRIPTION: These facilities provide capability for Delta II checkout, servicing, and launch. SLC-2 contains a launch pad, Launch Control Center, Solid Rocket Motor Processing Facility, and administrative and maintenance buildings. The complex also contains storage tanks for Delta fuels and gases. These facilities are fully utilized to support the Delta II mission model from VAFB and no changes are recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO NASA/KSC PAYLOAD SUPPORT FACILITIES AT VAFB

(NASA) (VAFB)

The NASA/KSC Payload Support Facilities at VAFB consist of the following buildings:

Engineering and Operations/840.
Spacecraft Laboratory/836.
NASA Supply Building/839.
Support Shop/831.
Tracking Station/810/811.
Hazardous Payload Processing Building/1610.

The Payload Processing Facilities consist of two (2) laminar flow class 100,000 cleanrooms located in Building 836 and a class 100,000 Hazardous Processing Facility, Building 1610. A telemetry/data acquisition station to support payload processing and Delta checkout and launch is located in Building 836. Other support capabilities include a Mission Director's Center with 18 consoles, a dynamic balance machine for spacecraft balancing, a high bay with a 25-ton bridge crane for loading/unloading heavy equipment, a support shop, supply building, and administrative office space.

These facilities provide support to meet the mission model requirements for NASA/NASA-sponsored/AF payloads and Delta vehicle launches at VAFB. The facilities are operated and maintained by a staff of 10 civil service and 35 support contractor personnel.

NO CHANGE TO NASA/KSC PAYLOAD SUPPORT FACILITIES AT VAFB

(NASA) (VAFB)

DESCRIPTION: The NASA/KSC Payload Support Facilities at VAFB consist of three payload cleanrooms, a telemetry station, a high bay for loading, unloading, and storage of heavy equipment, a supply building, support shop, and administrative office space. These facilities are fully utilized and are required to meet the mission model requirements for NOAA, POLAR, RADARSAT, and PEGASUS payload processing, as well as Delta support. The payload processing cleanrooms are shared with the Air Force on a non-interference basis.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO THE EMERGENCY LANDING SITES (ELS's)
HIGH AND LOW INCLINATION

(NASA, DOD, CIVIL, AND OTHER COUNTRIES)

Emergency landing sites are located worldwide in CONUS, Europe, Africa, and the South Pacific Basin. They range in runway length from 8,400 feet to 15,000 feet and widths of 148 feet to 300 feet. They are equipped with either a tactical air command and navigation system (TACAN) or distance measuring equipment (DME). The majority of these are active military and/or civil airfields. ELS's are for "May Day" situations when an Orbiter on orbit cannot reach a normal end-of-mission (EOM) site or even an augmented ELS. These sites provide an added safety measure for the Orbiter.

NO CHANGE TO THE EMERGENCY LANDING SITES (ELS's) HIGH AND LOW INCLINATION

(NASA, DOD, CIVIL, AND OTHER COUNTRIES)

DESCRIPTION: Emergency landing sites provide safety margins for the Orbiter while on orbit in the event of an emergency. These are existing airfields worldwide that have minimum required runway lengths and a navigational aid. The STS program has determined that these sites are the minimum necessary to provide effective worldwide coverage of landing potentials in case of an Orbiter emergency. Therefore, no changes are recommended.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. These facilities are required to support the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO PAYLOAD STORAGE FACILITIES

(NASA) (KSC)

These two buildings, M7-1410 and M7-1412, are old Apollo cryogenic facilities approximately 50 feet by 50 feet by 50 feet high and are used for storage for NASA payload customer containers. These buildings are approximately 1/2 mile west of the Vertical Processing Facility at KSC. The facilities are used to support the mission model and no change is recommended.

NO CHANGE TO PAYLOAD STORAGE FACILITIES

(NASA) (KSC)

DESCRIPTION: The Payload Storage Facilities, M7-1410 and M7-1412, are located south of the new Space Station Processing Facility at NASA/KSC. M7-1412 was used for liquid hydrogen servicing during the Apollo program and M7-1410 was used for liquid oxygen servicing. They are now fully utilized for temporary storage of customer payloads. No change is recommended by the team.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the mission model.

DATE: 12/6/93 **REV:** **CAT:** 1B

NO CHANGE TO SOUNDING ROCKET LAUNCH FACILITIES (PFRR)
(NASA/WFF) (ALASKA)

The sounding rocket launch facilities at the Poker Flat Research Range (PFRR), Fairbanks Alaska consist of the following:

Rocket Assembly Building "B", 1180 sq. ft. work bay which is equipped and approved for work on pyrotechnics and explosives. It is used for build up and check out of rocket motors.

Rocket Motor Storage Building, 1935 sq. ft. floor area which is equipped and approved for explosives storage. It is used for storage of rocket motors prior to build up and launch. It is equipped with a 5 Ton Bridge Crane.

Payload Assembly Building: 5475 sq. ft. of floor space which is equipped and is utilized for integration and checkout of sounding rocket payloads. Also included is a 30 ft. x 25 ft. area 100,000 class Clean Room.

Blockhouse: 1808 sq. ft. of floor space utilized as a Range Control Center and remote monitoring, final checkout, and control of rockets, payloads, and launchers during the count-down and launch of sounding rocket experiments. The structure is of reinforced concrete sufficient to withstand the impact of sounding boosters.

Launch Areas 1, 2 , & 4: Launch Areas 1 & 2 are equipped with MRL 7.5K rail rocket launchers suitable for launch of small to medium class sounding rockets. Launch Area 4 is equipped with an AML 20K launcher suitable for launch of larger sounding rockets. Each launch pad has a concrete reinforced cubicle where firing lines and payload control umbilicals from the blockhouse are terminated.

PFRR Offices: 2295 sq. ft. floor space containing administrative and technical offices and a small conference area for the PFRR Range.

These PFRR facilities support the national "Mission Model" requirements for the NASA Suborbital Science Program and are also utilized by DoD. The PFRR is the only facility of its kind in the Arctic region and is crucial to research in the upper atmosphere and mesosphere, in particular the auroral activity and the polar cleft region.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO SOUNDING ROCKET LAUNCH FACILITIES (PFRR)
(NASA/WFF) (ALASKA)

DESCRIPTION: The launch and payload processing facilities at Poker Flat Research Range, Alaska (PFRR) consist of a Blockhouse, Rocket Assembly Bldg "B", a Rocket Storage Bldg, a Payload Assembly Bldg, the PFRR Office, Launch Areas 1, 2, and 4. These facilities support sounding rocket launches to give the NASA Suborbital Science Program a capability to launch multi-rockets into a single auroral event with different class sounding rockets. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program. These facilities also support DoD programs. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO MOBILE LAUNCHERS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF rocket launchers designated as mobile launchers consist of one system of 7500 lb capacity and three systems of 8500 lb capacity. The systems have electrically driven azimuth and elevation setting and are remotely operated for safety reasons.

These launcher systems are a necessary part of the mobile range support equipment necessary to meet the national "Mission Model" requirements at remote locations for support of sounding rockets, balloons, and aeronautical research programs. A mobile range can be temporarily established virtually anywhere in the world to probe, measure, and explore scientific phenomena and events occurring in the atmosphere, mesosphere, and outer space.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO MOBILE LAUNCHERS
(NASA) (WFF)

DESCRIPTION: The WFF Mobile Launchers consist of one 7,500 lb capacity and three launchers with 8,500 lb capacities. These mobile launchers support remote sounding rocket campaigns worldwide. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program as identified in the mission model. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO LIQUID PROPELLANT STORAGE
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Liquid Propellant Storage consists of Liquid Propellant Storage Buildings Z-20 and Z-25; total area is 330 square feet for each building. Due to compatibility requirements of hazardous liquid propellants, two buildings are used for storage. The remote location of the buildings is required.

These facilities are used to store liquid propellants for attitude control systems and other low volume uses on Commercial and DoD launch vehicles. Z-20 & Z-25 are approved for explosive storage.

They are needed to meet the national "Mission Model" requirements for various Commercial missions as identified in the mission model. The liquid propellant storage facilities also support DoD programs at WFF.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO LIQUID PROPELLANT STORAGE
(NASA) (WFF)

DESCRIPTION: The WFF Liquid Propellant Storage consists of Liquid Propellant Storage Buildings Z-20 and Z-25. These facilities are used to store liquid propellants for attitude control systems and other low volume uses on Commercial and DoD launch vehicles. Z-20 & Z-25 are approved for explosive storage. They are needed to meet the national "Mission Model" requirements for various Commercial missions as identified in the mission model. The liquid propellant storage facilities also support DoD programs at WFF. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO PAYLOAD PROCESSING FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Payload Processing Facility, Bldg X-15, Rms. 107-112, 200- 213 on Wallops Island, consists of a total area of 8115 square feet. A three ton monorail crane with a 19'5" hook height is available as well as a one ton monorail crane with a 7'4" hook height (above the mezzanine). Current Use: Rooms 107-111 provide lab and office space for range users involved in payload checks and integration. Incubators, centrifuges, cold storage areas, ovens, and other miscellaneous equipment is provided. Room 112 is used for payload integration and checkout. Room 200 is a mezzanine area used for meetings and conferences of the user community. Rooms 202-213 are used for experiment and instrument checks and provide security for institutional proprietary information connected with individual activities.

This facility is needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. This WFF payload processing facility also supports DoD programs.

This facility is not fully utilized to support the mission model and is available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO PAYLOAD PROCESSING FACILITIES
(NASA) (WFF)

DESCRIPTION: The WFF Payload Processing Facilities consist of the Payload Processing Facility/X-15 on Wallops Island. This facility supports sounding rocket, target vehicle & drone, and commercial payload assembly, checkout, and testing for NASA, DoD and for Commercial users. This facility is needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. This WFF payload processing facility also support DoD programs. This facility is not fully utilized to support the mission model and is available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO RANGE SUPPORT FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Range Support Facilities on Wallops Island consist of:

Range Support Bldg W-22 with a total area of 9580 square feet. Current Use: Storage and minor maintenance of portable power equipment, rocket motor handling carts, general operations equipment (e.g., "cherry picker" bucket trucks and cranes).

Damage Control and Fire Station: (Bldg X-15, Rms. 103-106, 214-216) Total area of this section of the building is 3645 square feet. Current Use: This area of X-15 provides parking for the damage control vehicles on active alert. Offices and work space provide areas for 24 hour/day support.

Paint Shop Support Building: (Bldg. X-30) Total area is 1775 square feet. Current Use: The large bay provides an area for painting of support equipment used on launch pads (e.g., work stands, handling carts, and for painting operations for large equipment, e.g., launchers).

Launcher Maintenance Facility: (Bldg. X-35, Rm. 100) Total area is 15385 square feet. Current Use: Maintenance for launchers from all pads is accomplished from or in this building. Parts and equipment used to support launch operations are maintained, repaired or serviced, here.

Launch Support Services Building: (Bldg. X-55) Total area is 2530 square feet. Eight offices and 2 labs are located in the building. Current Use: Office space for Pad Supervisors and Launch Vehicle Technicians as well as lab and office space for Blockhouse support personnel is provided.

Launch Area "0" Service Building: (Z-40) Total area is 1830 square feet. Current Use: The building is an environmentally controlled facility supporting launches from Pad 0. Satellite launches for commercial operations are conducted from this pad. The building is used to provide space for control equipment for payloads and vehicles.

These facilities support sounding rocket, target vehicle & drone, and commercial launches for NASA, DoD and for Commercial users. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The range support facilities also support DoD programs at WFF.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO RANGE SUPPORT FACILITIES
(NASA) (WFF)

DESCRIPTION: WFF Range Support Facilities consist of the Range Ground Support Equipment Bldg/W-22, Damage Control & Fire Station/X-5, Paint Shop Support Bldg/X-30, Launcher Maintenance Facility (Room 100)/X-35, Launch Support Services Bldg/X-55, and the Launch Area "0" Service Bldg/Z-40. These facilities support sounding rocket, target vehicle & drone, and commercial launches for NASA, DoD and for Commercial users. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The range support facilities also support DoD programs at WFF. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO BLOCKHOUSES 1, 2, and 3
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Blockhouses consist of Blockhouse 1, 2 and 3. They are part of the rocket launch facilities located on Wallops Island. They provide individual launcher controls, firing circuits, command, control, communications, safety, coordination, and payload control functions to launch pads and are an integral part of the rocket launch facilities. Blockhouse 1/Z-65 is currently under renovation and will primarily support commercial launches as an unmanned terminal building. Blockhouse 2/Y-30 services the launch pad 2 area. Blockhouse 3/W-30 is currently undergoing some internal renovations and facility upgrading. It is the most formidable blockhouse with 8-foot thick walls. Currently Blockhouse 3 controls launch pads 0, 1, 3A, 3B, 4 and 5.

These blockhouses support sounding rocket, target vehicle & drone, and commercial launches for NASA, DoD and for Commercial users. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The blockhouses also support DoD programs at WFF.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO BLOCKHOUSES 1, 2, and 3
(NASA) (WFF)

DESCRIPTION: WFF Blockhouses consist of Blockhouse 1, 2 and 3. These blockhouses support sounding rocket, target vehicle & drone, and commercial launches for NASA, DoD and for Commercial users. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The blockhouses also support DoD programs at WFF. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO LAUNCH VEHICLE ASSEMBLY SHOPS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Launch Vehicle Assembly Shops consist of Assembly Shops 1, 3, 4, and 5. These shops are used to assembly sounding rockets, target vehicles & drones, and commercial launch vehicles for NASA, DoD and for Commercial users.

Assembly Shop 1: Bldg Y-15 has a total area of 8240 square feet; it contains eight assembly bays. A single bridge crane of 6000 lb. capacity is located in the large bay with a hook height of approximately 12 feet. The large bay can accommodate sounding rockets as large as the Aries class, however, the crane is not capable of lifting the Aries vehicle. The other bays can only accommodate smaller sounding rocket vehicles. This facility is not fully utilized.

Assembly Shop 3: Bldg W-65 has a total area of 13255 square feet; it contains six assembly bays. Bay 1 has two 20000 lb capacity cranes; bay 2 has two 15000 lb capacity cranes; bays 3, 5, and 6 have two 6000 lb cranes each; bay 4 is not equipped with a crane. A 10,000 class clean room is located in bay 6.

Assembly Shop 4: Bldg W-15 has a total area of 5165 square feet; it contains a single bay for rocket motor assembly and checkout. A single monorail crane of 4000 lb. capacity is available with a hook height of approximately 10 feet. This assembly shop was used as a Scout vehicle store room and is in need of refurbishing. This facility is not fully utilized.

Assembly Shop 5: Bldg W-40 has a total area of 5155 square feet; it contains a single bay for rocket motor assembly and checkout. The facility currently supports the DoD VANDAL Project. This facility is fully utilized.

These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The assembly shops also support DoD programs at WFF.

Note: Assembly Shop 3 is the only vehicle assembly shop which has the capability to support Castor IV and larger boosters. The Conestoga vehicle requires all bays of this facility for approximately two months for buildup. If the Conestoga Program develops into 2 or more launches per year, and the Ballistic Missile Defense Organization (BMDO) continues to launch 3 or 4 major sounding rockets per year from WFF, severe scheduling problems will probably occur.

NO CHANGE TO LAUNCH VEHICLE ASSEMBLY SHOPS
(NASA) (WFF)

DESCRIPTION: The WFF Launch Vehicle Assembly Shops consist of Assembly Shop 1, 3, 4, and 5. These shops are used to assembly sounding rockets, target vehicles & drones, and commercial launch vehicles for NASA, DoD and for Commercial users. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The assembly shops also support DoD programs at WFF. These facilities are not fully utilized to support the mission model and are available for additional tasks. Note: Assembly Shop 3 is the only vehicle assembly shop which has the capability to support Castor IV and larger boosters. The Conestoga vehicle requires all bays of this facility for approximately two months for buildup. If the Conestoga Program develops into 2 or more launches per year, and the Ballistic Missile Defense Organization (BMDO) continues to launch 3 or 4 major sounding rockets per year from WFF, severe scheduling problems will probably occur.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO LAUNCH PADS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Launch Pads consist of Pad 0 with a Commercial Conestoga launcher; Pad 1 with a 50, 000 lb capacity launcher; Pad 2 with two 4,000 lb, one 5,000 lb and one 20,000 lb capacity launchers; Pad 3B with a 20, 000 lb launcher, and Pad 5 with a Navy VANDAL launcher.

They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The launch pads also support DoD programs at WFF.

All WFF launch pads are located on Wallops Island; the Wallops Flight Facility on Wallops Island is the only NASA-owned launch range.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO LAUNCH PADS
(NASA) (WFF)

DESCRIPTION: WFF Launch Pads consist of Pad 0 with a Commercial Conestoga launcher; Pad 1 with a 50, 000 lb capacity launcher; Pad 2 with two 4,000 lb, one 5,000 lb and one 20,000 lb capacity launchers; Pad 3B with a 20, 000 lb launcher, and Pad 5 with a Navy VANDAL launcher. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program and various Commercial missions as identified in the mission model. The launch pads also support DoD programs at WFF. All WFF launch pads are located on Wallops Island; the Wallops Flight Facility on Wallops Island is the only NASA-owned launch range. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO SPIN BALANCE FACILITY
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Spin Balance Facility consists of the Spin Control Center Bldg/V-50, the North Spin Bay/V-55, and the South Spin Bay/V-45. Rocket motors and satellites from a variety of domestic and international users are balanced.

These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO SPIN BALANCE FACILITY
(NASA) (WFF)

DESCRIPTION: The WFF Spin Balance Facility on Wallops Island consists of the Control Center Bldg/V-50, the North Spin Bay/V-55, and the South Spin Bay/V-45. Rocket motors and satellites from a variety of domestic and international users are balanced. These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT**: 1B

NO CHANGE TO FIXED TELEMETRY SYSTEMS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Fixed Telemetry Systems consist of two 7.5 meter S-band antenna and two 2.4 meter S-band antenna receivers, recorders, display, and data processing equipment. The 2.4 meter systems accommodate frequencies of: 1435-1540 MHz, 1650-1710 MHz, and 2200-2300 MHz. The 7.5 meter systems accommodate frequencies in the 1400-2400 MHz range.

The systems provide data acquisition, display, recording and data processing for sounding rocket and balloon borne experiments, and aeronautical research projects. WFF is the designated east coast location for assembly, integration and satellite launch operations for the SELVS program, therefore the support from these systems is a crucial part of the operation.

The WFF Fixed Telemetry Systems support the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various commercial missions identified in the mission model. The systems also support NASA airborne science and aeronautical programs at WFF for a variety of users.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO FIXED TELEMETRY SYSTEMS
(NASA) (WFF)

DESCRIPTION: The WFF Fixed Telemetry Systems consist of two 7.5 meter S-band antenna and two 2.4 meter S-band antenna receivers, recorders, display, and data processing equipment. The 2.4 meter systems accommodate frequencies of: 1435-1540 MHz, 1650-1710 MHz, and 2200-2300 MHz. The 7.5 meter systems accommodate frequencies in the 1400-2400 MHz range. These systems are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. They also support NASA airborne science and aeronautical programs at WFF for a variety of users. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO MOBILE TELEMETRY SYSTEMS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Mobile Telemetry Systems consist of tracking, receiving and recording equipment mounted in transportable vans. Vans include a 26 ft "recreational-type" vehicle (MT1), a 40 ft trailer van (MT2), and a 40 ft expandable trailer van (MT3). Mobile antenna and tracking mounts available include: two 6 ft diameter, two 8 ft diameter, two 10 ft diameter, one 18 ft diameter, and one 20 ft diameter aperture system. The primary frequency capability is 2200-2300 MHz, however, some capability exists for 215-260 MHz, 1435-1540 MHz and 1650-1710 MHz.

The systems are a necessary part of the mobile range support equipment to meet the national "Mission Model" requirements at remote locations for support of sounding rockets, balloons, and aeronautical research programs. A mobile range can be temporarily established virtually anywhere in the world to probe, measure and explore unique scientific phenomena and events occurring in the atmosphere, mesosphere, and outer space.

The systems support missions worldwide. These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO MOBILE TELEMETRY SYSTEMS
(NASA) (WFF)

DESCRIPTION: The WFF Mobile Telemetry Systems consist of tracking, receiving and recording equipment mounted in transportable vans. Vans include a 26 ft recreational vehicle (MT1), a 40 ft trailer van (MT2), and a 40 ft expandable trailer van (MT3). Mobile antenna and tracking mounts available include: two 6 ft diameter, two 8 ft diameter, two 10 ft diameter, one 18 ft diameter, and one 20 ft diameter aperture system. The primary frequency capability is 2200-2300 MHz, however, some capability exists for 215-260 MHz, 1435-1540 MHz and 1650-1710 MHz. The facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The systems are a necessary part of the mobile range support equipment necessary to meet the national "Mission Model" requirements at remote locations for support of sounding rockets, balloons, and aeronautical research programs. A mobile range can be temporarily established virtually anywhere in the world to probe, measure and explore unique scientific phenomena and events occurring in the atmosphere, mesosphere, and outer space. The systems support missions worldwide. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:
CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO COMMAND/CONTROL/COMMUNICATIONS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Command/Control/Communications facilities consist of the Main Base Terminal Room; the RF Communication Receiver Site; the Wallops Mainland Command Transmitter Site and Communication Transmitters; Closed Circuit Television System; the Time Delay Multiple Access (TDMA) satellite communication system and the WFF Cable Plant.

These facilities provide the communications, command, and control infrastructure required to launch rockets and balloons and to conduct other tests on the WFF Test Range.

These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The command/control/communication infrastructure supports all programs at WFF for a variety of users.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO COMMAND/CONTROL/COMMUNICATIONS
(NASA) (WFF)

DESCRIPTION: WFF Command/Control/Communications facilities consist of the Main Base Terminal Room; the RF Communication Receiver Site; the Command Transmitter Site and Communication Transmitters; Closed Circuit Television System; the Time Delay Multiple Access (TDMA) satellite communication system and the WFF Cable Plant. The facilities are the infrastructure at WFF to move information from user to user or from system to system. These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The command/control/communication infrastructure supports all programs at WFF for a variety of users. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO NASA BALLOON PROGRAM SUPPORT
(NASA) (NSBF) WALLOPS FLIGHT FACILITY (WFF)

NASA Balloon Program Support facilities consist of the Balloon R & D Laboratory at WFF and the National Scientific Balloon Facility (NSBF) at Palestine, Texas & Ft Sumner, New Mexico. The launch sites are located so that large scientific balloons can fly over sparsely populated areas. These facilities support the launch and flight of large scientific balloon systems.

These facilities are needed to meet the national "Mission Model" requirements for the NASA Balloon Program as identified as part of the NASA Suborbital Science Program.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO NASA BALLOON PROGRAM SUPPORT
(NASA) (WFF) (NSBF)

DESCRIPTION: NASA Balloon Program Support facilities consist of the Balloon R & D Laboratory at WFF and the National Scientific Balloon Facility (NSBF) at Palestine, Texas & Ft Sumner, New Mexico. The launch sites are located so that large scientific balloons can fly over sparsely populated areas. These facilities are devoted the development and operation of state of the art scientific ballooning including long duration ballooning. These facilities support the launch and flight of large scientific balloon systems. These facilities are needed to meet the national "Mission Model" requirements for the NASA Balloon Program as identified as part of the NASA Suborbital Science Program. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT**: 1B

NO CHANGE TO SURVEILLANCE RADAR SYSTEMS
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Surveillance Radar Systems consist of:

ASR-7 Radar System on the Main Base: (N-159, Rm E-207) Current Use: The ASR-7 Radar provides airspace and surface surveillance information, as required, to the WFF Range Control Center during operations.

SPS-64 Pathfinder Radar System on the Main Base: Current Use: The SPS-64 Radar provides surface surveillance information, as required, to the WFF Range Control Center during operations.

These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The systems also support DoD programs.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO SURVEILLANCE RADAR SYSTEMS
(NASA) (WFF)

DESCRIPTION: WFF Surveillance Radar Systems consist of the ASR-7 Radar System, and the SPS-64 Pathfinder Radar System. These systems are used for surveillance of ships in waters off the WFF Test Range. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The systems also support DoD programs. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO ROCKET MOTOR/PYROTECHNIC STORAGE
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Rocket Motor/Pyrotechnic Storage facilities consist of:

Earthen Covered Bunker Storage Magazines: (M-9 - M-12, M-14) Total area of each building is 460 square feet. The location of the "M" area is in an isolated part of the Wallops Flight Facility Main Base. Current Use: Storage of various rocket motors and pyrotechnic systems. Storage compatibility of rocket motors of different classes require separate storage areas.

Explosive Storage Building on the Main Base: (M-15) Total area is 15570 square feet. Current Use: One large room is used for logistic support for incoming, outgoing rocket motor processing. Visual inspection and verification of acceptance procedures is accomplished in the adjacent non-destructive testing room. Rocket motors are processed here before they are moved to Wallops Island for final assembly before being mounted on the launcher.

Above Ground Explosive Storage Magazine on the Main Base: (M-22) Total area is 4950 square feet. Current Use: All types of rocket motors except DoD class 1.1 motors are stored in M-22. Some logistics support and testing is accomplished here. Rocket motors are stored here before they are moved to Wallops Island for final assembly before being mounted on the launcher.

Rocket Motor Storage on Wallops Island: (V-80) Total area is 5845 square feet. Current Use: DoD class 1.1 rocket motors are stored in this building. The remoteness of the location (the north end of Wallops Island) is required.

These WFF facilities are approved for handling explosives and are fully utilized to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Services (SELVS) Program, DoD Pegasus Program, and various Commercial missions as identified in the mission model.

These facilities are fully utilized to support the mission model. No change is recommended by the PPLR Team.

NO CHANGE TO ROCKET MOTOR/PYROTECHNIC STORAGE
(NASA) (WFF)

DESCRIPTION: WFF Rocket Motor/Pyrotechnic Storage facilities consist of five Earthen Covered Bunker Storage Magazines (M9, M12, and M14), the Explosive Storage Office/M15, the Above Ground Explosive Storage Magazine/M-22, and Rocket Motor Storage/V-80. These facilities are approved for handling explosives and are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, DoD Pegasus Program, and various Commercial missions as identified in the mission model. These facilities are filled near capacity; however short term storage of small quantities of explosives can usually be accommodated.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO FACILITIES SUPPORT
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Facilities Support is housed in the Facilities Operations Building/F16. This building contains the carpenter, painting, electric, plumber/pipe fitting, and welding shops; the garage; operations and maintenance materials storage, and the facility operations offices.

These operations are needed to support the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. This operation also supports all approved programs at WFF for a variety of users.

The building which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions. No change is recommended by the PPLR Team.

NO CHANGE TO FACILITIES SUPPORT
(NASA) (WFF)

DESCRIPTION: The WFF Facilities Support consists of the Facilities Operations Office/F16. This operation is required to support the WFF utilities infrastructure. These operations are needed to support the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. This operation also supports all approved programs at WFF for a variety of users. The building which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. This facility is required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO NASA SOUNDING ROCKET PROGRAM SUPPORT
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The NASA Sounding Rocket Program Support Facilities at WFF provide the most significant collection of capabilities in them world for the design, development, fabrication, and test of scientific suborbital space payloads for sounding rockets.

The support facilities at WFF consist of the Printed Circuit Layout & Photo Plotting Lab, Printed Circuit Processing Lab, Ultrasonic Cleaning Facility and Supply/F-8, Attitude Control Systems Lab - Pneumatic Fabrication & Test, Attitude Control Systems Lab - Electronic Fabrication & Test, Attitude Control Systems Lab - Magnetic Air Bearing, Dynamic Balance Facility, Experimental Mechanical Construction (Machine Shop - Fabrication), Flight Vehicles & Systems Section Lab, Integration and Checkout Facility, Liquid Nitrogen Facility, Mass Properties Measurement Laboratory, Rotary Accelerator (Centrifuge) Laboratory, Spin Test and Deployment Laboratory, Static Loads Laboratory, Thermal Vacuum and Space Simulation Laboratory, Vibration Laboratory, Magnetic Field Simulation Laboratory, Mobile Equipment Shipping Containers, three Transportable Clean Rooms, and the launcher at the LC-36 Launch Complex (at White Sands Missile Range).

These facilities are fully occupied. However, the facilities are normally used by one shift and other shifts could be added to increase the amount of work performed. These facilities, labs, and test sites support the NASA Sounding Rocket Program. These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program missions as identified in the mission model. Some of these facilities also required to support other approved programs at WFF.

No change to the NASA Sounding Rocket Program Support Facilities at WFF is recommended by the PPLR Team.

NO CHANGE TO NASA SOUNDING ROCKET PROGRAM SUPPORT
(NASA) (WFF)

DESCRIPTION: The NASA Sounding Rocket Program Support facilities at WFF consist of the Printed Circuit Layout & Photo Plotting Lab, Printed Circuit Processing Lab, Ultrasonic Cleaning Facility and Supply/F-8, Attitude Con. Sys. Lab - Pneumatic Fabrication & Test, Attitude Con. Sys. Lab - Elect. Fabrication & Test, Attitude Con. Sys. Lab - Magnetic Air Bearing, Dynamic Balance Facility, Experimental Mechanical Construction (Machine Shop - Fabrication), Flight Vehicles & Systems Section Lab, Integration and Checkout Facility, Liquid Nitrogen Facility, Mass Properties Measurement Laboratory, Rotary Accelerator (Centrifuge) Laboratory, Spin Test and Deployment Laboratory, Static Loads Laboratory, Thermal Vacuum and Space Simulation Laboratory, Vibration Laboratory, Magnetic Field Simulation Laboratory, Mobile Equipment Shipping Containers, three Transportable Clean Rooms, and the launcher at the LC-36 Launch Complex (at White Sands Missile Range). These facilities are fully occupied and there is no room for expansion or adding new equipment (without removing older equipment.) However, the facilities are normally used by one shift and other shifts could be added to increase the amount of work performed. These facilities, labs, and test sites support the NASA Sounding Rocket Program. These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program missions as identified in the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO LOGISTICS FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Logistics Facilities consist of the WFF Logistics, Management, and Shipping Office/F-7, and the Receiving Office/F-19. These facilities are critical for the receiving, accountability and shipping of material at WFF. They also provide supply and property support to WFF operations.

These WFF facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The facilities also required to support Test Range programs at WFF for a variety of users.

They are not fully utilized to support the mission model and are available for additional tasks. The buildings which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions. No change is recommended by the PPLR Team.

NO CHANGE TO LOGISTICS FACILITIES
(NASA) (WFF)

DESCRIPTION: The WFF Logistics Facilities consist of the WFF Logistics, Management, and Shipping Office/F-7, and the Receiving Office/F-19. These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The facilities also required to support Test Range programs at WFF for a variety of users. They are not fully utilized to support the mission model and are available for additional tasks. The buildings which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO MOBILE INSTRUMENTATION RADAR
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Mobile Instrumentation Radar Systems and support facilities consist of the Mobile Radar Shop/Office/Storage/E-134, Mobile Radar Laboratory/U-40, and four C-band RIR-776 Mobile Radar Systems (Radars #2, #8, #9, and #10).

These radar systems track aircraft, rockets, balloons, and satellites. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The systems support missions worldwide. The WFF Mobile Instrumentation Radar (RIR-778C) systems are mobile C-Band systems designed and built to obtain, highly accurate positional data of various airborne targets for flight test programs. The electronic systems are mounted in 40 ft vans. Basic specifications are:

Frequency: C-Band, 5400 to 5900 MHz	Antenna Size: 2.38m or 3.66m Cassegrain
Peak Power Output: 1 MW	Beamwidth: 3.0 degree or 1.1 degree
Skin Track 1m^2: 220 Km or 425 Km	

The systems are a necessary part of the mobile range support equipment necessary to meet the national "Mission Model" requirements at remote locations to support sounding rockets, balloons, and aeronautical research programs. A mobile launch range can be temporarily established virtually anywhere in the world to probe, measure, and explore unique scientific phenomena and events occurring in the atmosphere, mesosphere, and outer space.

These facilities are not fully utilized to support the mission model and are available for additional tasks. These systems are extensively scheduled; however, at times they are available to support other projects. No change is recommended by the PPLR Team.

NO CHANGE TO MOBILE INSTRUMENTATION RADAR
(NASA) (WFF)

DESCRIPTION: The WFF Mobile Instrumentation Radar Systems and support facilities consist of the Mobile Radar Shop/Office/Storage/E-134, Mobile Radar Laboratory/U-40, and four C-band RIR-776 Mobile Radar Systems (Radars #2, #8, #9, and #10). These radar systems track aircraft, rockets, balloons, and satellites. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The systems are a necessary part of the mobile range support equipment necessary to meet the national "Mission Model" requirements at remote locations to support sounding rockets, balloons, and aeronautical research programs. A mobile launch range can be temporarily established virtually anywhere in the world to probe, measure, and explore unique scientific phenomena and events occurring in the atmosphere, mesosphere, and outer space. The systems support missions worldwide. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO ENGINEERING SUPPORT FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Engineering Support Facilities are located on the WFF Main Base. The facilities consist of the Data & Communications Systems Section Engineering Lab, Range Engineering Offices, the WFF Telemetry Laboratory in building E-108. Also included is the Data & Communications Systems Section Engineering Lab/E-134, Quality Verification Facility/F-160, and the WFF Data Analysis Laboratory.

They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These engineering support facilities are also required to support all WFF Test Range programs for a variety of users.

These buildings are fully occupied. However, the facilities are normally used by one shift and other shifts could be added to increase the amount of work performed. No change is recommended by the PPLR Team.

NO CHANGE TO ENGINEERING SUPPORT FACILITIES
(NASA) (WFF)

DESCRIPTION: The WFF Engineering Support Facilities consist of the Data & Communications Systems Section Engineering Lab, Range Engineering Offices, the WFF Telemetry Laboratory in building E-108. Also included is the Data & Communications Systems Section Engineering Lab/E-134, Quality Verification Facility/F-160, and the WFF Data Analysis Laboratory. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These engineering support facilities are also required to support all WFF Test Range programs for a variety of users. These buildings are fully occupied and there is no room for expansion or adding new equipment (without removing older equipment.) However, the facilities are normally used by one shift and other shifts could be added to increase the amount of work performed. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO METEOROLOGICAL/ATMOSPHERIC FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

WFF Meteorological/Atmospheric Facilities are located on Wallops Main Base, Wallops Mainland and Wallops Island. The facilities consist of the Weather Forecast Office, the Ionosphere Sounding System/E-144, Meteorological Operations Office/N-162, the Meteorological Balloon Launch Facility/N-179, the Meteorological Observation Center/X-85, Meteorological Instrument Development Lab/X-86, a 160ft and 300ft meteorological tower, and the facilities of the Atmospheric Science Research Facility (ASRF). Atmospheric Science Research Facilities are: ASRF (SPANDAR) Radar Signal Processor (RSP-S), ASRF (SPANDAR) S- Band Radar, ASRF Electric Field Mill Network (EFMN), ASRF Environmental Data Acquisition & Data Recording System (EDARS), ASRF Lightning Detection and Ranging (LDAR), ASRF SFERICS Facility, and the ASRF UHF Radar Signal Processor (RSP-U).

The facilities provide weather forecasting, lightning detection warnings, wind and other meteorological measurements; and ionospheric data gathering as required for WFF Test Range projects. The meteorological facilities at WFF provide 2/day radiosonde support to the NOAA/National Weather Service on a reimbursable basis.

The Atmospheric Science Research Facility (ASRF) provides an excellent facility for conducting atmospheric research such as atmospheric turbulence, cloud and precipitation development, precipitation effects on electromagnetic radiation and lightning. The ASRF also supports various sounding rocket and aeronautical research projects.

These facilities are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These Meteorological/Atmospheric facilities are also required to support WFF Test Range programs for a variety of users.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO METEOROLOGICAL/ATMOSPHERIC FACILITIES
(NASA) (WFF)

DESCRIPTION: WFF Meteorological/Atmospheric Facilities consist of the Weather Forecast Office, the Ionospheric Sounding System/E-144, Meteorological Operations Office/N-162, the Meteorological Balloon Launch Facility/N-179, the Meteorological Observation Center/X-85, Meteorological Instrument Development Lab/X-86, a 160 ft and 300 ft met tower, and the facilities of the Atmospheric Science Research Facility (ASRF). Atmospheric Science Research Facilities are: ASRF (SPANDAR) Radar Signal Processor (RSP-S), ASRF (SPANDAR) S- Band Radar, ASRF Electric Field Mill Network (EFMN), ASRF Env. Data Acq. & Data Recording Sys. (EDARS), ASRF Lightning Detection and Ranging (LDAR), ASRF SFERICS Facility, and the ASRF UHF Radar Signal Processor (RSP-U). These are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These Meteorological/Atmospheric facilities are also required to support WFF Test Range programs for a variety of users. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO RANGE CONTROL CENTER
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Range Control Center (RCC) consists of: (building E-106, Rms. 100, 101, 200, 201, 202, 202A and Bldg. E-107 Rms. 101, 201, 202, 202A). The individual rooms of the RCC are: Computer Room, Instrumentation Room, Mission Control Room, Surveillance and Down Range Communication Room, Data Acquisition and Processing Room, Data Quality Work Room, Computer Lab, Tape Storage, Secure Room, Range Safety Room, and Range Safety Work Room. The Aeronautical Control Room (Bldg. E-106, Rm 400, 468 square feet) can be an extension of the Mission Control Room.

Current Use: The Computer Room is used to process incoming data from all range assets and record information on tape or disc. The Instrumentation Room is used to route incoming data to the required room of the RCC. The Mission Control Room is the hub of the RCC as is used for command and control functions during operations. Data is displayed for Range Users in numerous formats. The Surveillance and Down Range Communication Room is used for communi-cations with down range sites and to display surveillance radar data for range safety functions. The Data Acquisition and Processing Room is used for assessing incoming data quality, and for data quality of Mission Control Room displays. The Data Quality Work Room is an extension of the Data Acquisition and Processing Room. The Computer Lab is a work area for the Computer Room. The Secure Room provides an area where project personnel can display sensitive information. The Range Safety Room is used for flight and ground safety analysis and data display and Wind Weighting functions with an extension in the Range Safety Work Room. The Aeronautical Control Room is used for command and control of aircraft projects and can be used by range users to provide extra space for project personnel to evaluate mission parameters.

This facility is necessary to meet the national "Mission Model" by providing command and control of all launch operations for the NASA Suborbital Programs, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various DoD and Commercial programs. Command and control for Aeronautical programs and other research projects are also conducted from the RCC.

The buildings which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions. No change is recommended by the PPLR Team.

NO CHANGE TO RANGE CONTROL CENTER
(NASA) (WFF)

DESCRIPTION: The WFF Range Control Center consists of the Integrated Data System Office, Computer Room, Instrumentation Room, Range Control Center mission floor, and Range Management Office. These are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The Control Center is also required to support all Test Range programs at WFF for a variety of users. The buildings which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV:** 1/31/94 **CAT:** 1B

NO CHANGE TO MANAGEMENT/ADMINISTRATION FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Management/Administrative Facilities are located on Wallops Main Base. They consist of the Information Technology Center, Procurement & Fiscal Offices, the Technical Library, Sounding Rocket/Balloon Project Office, Reproduction & Graphic Arts, the Telecommunications Facility, WFF Administration (HQ), and the WFF Reception Center and Visitor Control. These facilities are located in buildings E-105, E-106, E-107, E-108, F-1, F-2, F-6, N-127.

They provide the core technical, administrative and management support required for safe, efficient and effective operations at WFF and the WFF Test Range. These facilities also provide the interface with external communications, organizations, and individuals. Facilities are upgraded as required to accommodate evolving requirements and incorporate technological improvements.

They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These facilities are also required to support all other NASA, DoD, DOT, FAA, and Commercial programs at WFF.

The buildings which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions. No change is recommended by the PPLR Team.

NO CHANGE TO MANAGEMENT/ADMINISTRATION FACILITIES
(NASA) (WFF)

DESCRIPTION: The WFF Management/Administrative Facilities consist of the Information Technology Center, Procurement & Fiscal Offices, the Technical Library, Sounding Rocket/Balloon Project Office, Reproduction & Graphic Arts, the Telecommunications Facility, WFF Administration (HQ), and the WFF Reception Center and Visitor Control. These facilities are located in buildings E-105, E-106, E-107, E-108, F-1, F-2, F-6, N-127. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. These facilities are also required to support all other NASA, DoD, DOT, FAA, and Commercial programs at WFF. The buildings which house these facilities are fully occupied, however, the facilities themselves do have the capability to support more missions.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT**: 1B

NO CHANGE TO OPTICAL TRACKING FACILITIES
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Optical Tracking Facilities consist of the WFF Photo Laboratory/E-2, the WFF Closed Circuit Television System, two Mark III Intermediate Focal Length Optical Tracker (IFLOT) camera stations, two Mark I IFLOT camera stations, two Short Range optical trackers, four fixed area domes, and the Wallops Island Optical Systems Section Support Building, X-15.

These provide launch documentary and tracking support. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The Optical Tracking Facilities are also required to support NASA airborne science and aeronautical programs at WFF for a variety of users.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO OPTICAL TRACKING FACILITIES
(NASA) (WFF)

DESCRIPTION: The WFF Optical Tracking Facilities consist of the WFF Photo Laboratory/E-2, the WFF Closed Circuit Television System, two Mark III Intermediate Focal Length Optical Tracker (IFLOT) camera stations, two Mark I IFLOT camera stations, two Short Range optical trackers, four fixed area domes, and the Wallops Island Optical Systems Section support building/X-15. These provide launch documentary and tracking support. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The Optical Tracking Facilities are also required to support NASA airborne science and aeronautical programs at WFF for a variety of users. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO FIXED INSTRUMENTATION RADAR
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF Fixed Instrumentation Radar systems consist of one AN/FPQ-6, one AN/MPS-19, and two RIR-716 (AN/FPS-16 class) radars. The AN/FPQ-6 and RIR-716 radar are high precision, C-Band, monopulse tracking radars capable of providing continuous, accurate spherical-coordinate information on targets out to a range of 60,000 kilometers. The C-Band systems are computer based RF trackers. The Airport RIR-716 is also equipped with a precision laser tracker. The AN/MPS-19 radar is an S-Band system used primarily as an acquisition aid for the narrow beam width precision C-Band system. Basic specifications of the WFF fixed instrumentation radars are:

	AN/FPQ-6	RIR-716 (ISLAN D)	RIR-716 (AIRPORT)		AN/FPS-19
			RF	LASER	
Frequency Band	C	C	C	IR	S
Peak Power Output	3MW	1MW	1MW	125W	325KW
Antenna Size	8.84M	3.66M	4.88M	0.18M	2.44M
BeamWidth (degrees)	0.39	1.23	0.71	0.11	3.0
Skin Track 1m2	1300Km	350Km	435Km	N/A	100Km

The WFF radar systems support the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various commercial missions identified in the mission model. The systems provide accurate positional data for sounding rocket and balloon borne experiments. The Airport RIR-716 radar provides precision baseline positional data for aeronautical research flights as well as rocket and balloon tracks.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO FIXED INSTRUMENTATION RADARS
(NASA) (WFF)

DESCRIPTION: The WFF Fixed Instrumentation Radars at WFF consist of one AN/FPQ-6, one AN/FPS-16, and two RIR-716 (AN/MPS-19 class) radars. These radar systems track aircraft, rockets, and satellites. They are needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions (Conestoga) as identified in the mission model. The radars are also required to support NASA airborne science and aeronautical programs at WFF for a variety of users. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO RESEARCH AIRPORT
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF airport consists of three runways, two taxiways, three ramps, two hangars and a remotely located hazardous cargo loading area. The longest runway is 8750 feet. The largest hangar contains 25,600 square feet of floor space. All runways are lighted and each approach is equipped with approach lights. The runways are certified for precision, non-precision and/or circling approaches. The airport is located adjacent to a restricted area and off-shore warning areas as part of the WFF Test Range. Fuel dispensing with a storage capacity of 100,000 gallons of JP-5 and a full compliment of ground support equipment are available. Fuel truck parking and aircraft wash aprons are equipped with environmental protection control systems.

Aeronautical projects are supported at the airport with laser/radar tracking systems, optical trackers, telemetry tracking capability, an FAA certified microwave landing system, and a local surveillance radar. Also available are a research runway designed with grooved and a variety of textured surfaces, a flood controlled test area, two sets of E-28 arresting gear, a runway-to-taxiway high-speed turn-off with magnetic leader cable, miscellaneous shop support, visiting project office and shop space at the hangars, and a medical facility.

Aircraft operations are supported by NOAA/FAA certified control tower operators; ground-to-ground, VHF, UHF and HF, FCC-approved frequencies; meteorological services; and a well equipped crash, fire and rescue unit.

The WFF Research Airport is needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The airport is also required to support NASA airborne science and aeronautical programs at WFF for a variety of users. The Wallops Flight Facility research airport, part of the WFF Test Range, is the only NASA-owned airfield.

These facilities are not fully utilized to support the mission model and are available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO RESEARCH AIRPORT
(NASA) (WFF)

DESCRIPTION: The WFF Research Airport consists of the following facilities: Aircraft Wash Apron; Fuel Truck Parking Apron; Runway 04/22 (including Runway Test Section); Runway 10/28; Runway 17/35 (including Ordnance Loading Area), Control Tower Bldg/A-1, Fire Station/B-129, Airborne Radar Systems Operations and Maintenance Shop, Hangar Bay/D-1, and the Hangar Bay/N-159. The WFF Research Airport is needed to meet the national "Mission Model" requirements for the NASA Suborbital Science Program, the NASA Small Expendable Launch Vehicle Services (SELVS) Program, and various Commercial missions as identified in the mission model. The airport is also required to support NASA airborne science and aeronautical programs at WFF for a variety of users. These facilities are not fully utilized to support the mission model and are available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. These facilities are required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT: 1B**

NO CHANGE TO RANGE SURVEILLANCE AND RESEARCH AIRCRAFT
(NASA) WALLOPS FLIGHT FACILITY (WFF)

The WFF P-3B aircraft (NASA 426) is a U. S. Navy surplus 4 engine turboprop aircraft which provides range surveillance support to WFF to meet the national "Mission Model" for NASA, DOD, and commercial rocket launches. Surveillance radar systems are mounted in this aircraft to monitor surface targets in the impact areas to assure impact safety criteria are met. The cabin, bomb bay, and some flight instrumentation systems have been adopted to support research projects including airborne science missions, remote ocean surface sensor development, and aeronautical programs. Typical science missions are ocean remote sensing, atmospheric surveys of volcanic eruptions, Arctic atmospheric constituents measurements, and monitoring of the Greenland icecap.

This facility is not fully utilized to support the mission model and is available for additional tasks. No change is recommended by the PPLR Team.

NO CHANGE TO RANGE SURVEILLANCE AND RESEARCH AIRCRAFT

(NASA)(WFF)

DESCRIPTION: The WFF NASA 426, P-3B aircraft provides range surveillance support at WFF to meet the national "Mission Model" for NASA, DoD, and commercial launches at WFF. The aircraft also supports NASA airborne science and aeronautical programs. This facility is not fully utilized to support the mission model and is available for additional tasks.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR Team. This facility is required to meet the mission model.

DATE: 1/31/94 **REV**: 1/31/94 **CAT:** 1B

NO CHANGE TO WEATHER OPERATIONS BUILDING

(AIR FORCE) (CCAFS)

This facility is fully utilized and supports the mission model by providing weather data in support of multiple launch programs. Rawindsonde balloons are released from this site to obtain upper air wind data. This facility includes tracking equipment to track balloons and receive weather parameters for use in launch support and daily weather support activities. Tracking equipment is also used to track meteorological sounding rockets. Personnel are trained to prepare sondes, release balloon with sonde, operate tracking equipment, reduce data, and provide data to customers. This facility is manned two shifts, 7 days a week.

See Figure PPLR-49.

FILE: WOB1

NO CHANGE TO WEATHE. ƆPERATIONS BUILDING
(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model by providing weather data to multiple launch programs. Upper air (rawindsonde) data collected from balloons launched from this facility are used to form a basis for forecasts, advisories, and warnings for all phases of operations and for resource protection.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: WOB

NO CHANGE TO FUEL STORAGE AREA 5

(AIR FORCE) (CCAFS)

This area supports all spacecraft/launch vehicle programs on the eastern range (ER) and is used to store solid rocket motors, safe and arm devices, explosive transfer lines, flight termination/destruct system charges, and ancillary explosive devices. The facilities in this area are sited for class 1, division 1 explosives (100,000 lbs).

As an exception to the other facilities located in this area the Missile Research Test Building II is used for rocket motor build up and processing.

See Figure PPLR-50.

NO CHANGE TO FUEL STORAGE AREA 5

(AIR FORCE) (CCAFS)

DESCRIPTION: The facilities in this area are mostly used for ordnance storage as well as some rocket motor build-up/processing. These facilities are fully utilized and support multiple programs in the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** 12/06/93 **CAT:** 1B

FILE: FSAS

NO CHANGE TO KSC SHUTTLE LANDING FACILITY (SLF)

WEATHER OBSERVATION FACILITY

(AIR FORCE/NASA) (KSC)

This facility is fully utilized and supports the mission model by providing weather data to support all aspects of the Shuttle launch/flight operations as well as for resource protection at CCAFS and KSC. This facility is manned 24 hours a day, 7 days a week.

See Figure PPLR-51.

FILE: KSCWOF1

NO CHANGE TO KSC SHUTTLE LANDING FACILITY (SLF)
WEATHER OBSERVATION FACILITY

(AIR FORCE/NASA) (KSC)

DESCRIPTION: This is fully utilized and facility supports the mission model by providing weather data required to support all aspects of Shuttle launch/flight operations.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: KSCWOF

NO CHANGE TO FUEL STORAGE AREA 2

(AIR FORCE) (CCAFS)

This area supports all spacecraft/launch vehicle programs on the Eastern Range (ER) and is used to store solid rocket motors, safe and arm devices, explosive transfer lines, flight termination/destruct system charges, and ancillary explosive devices. The facilities in this area are sited for class 1, division 1 explosives (100,000 lbs).

In addition to the functions described above there are two facilities that support additional functions. The Electromechanical Test (EMT) Facility is used for the testing/checkout of small ordnance devices. The Missile Research Test Building I is used for rocket motor conditioning--cold soak-- and rocket motor build up.

See Figure PPLR-52.

NO CHANGE TO FUEL STORAGE AREA 2

(AIR FORCE) (CCAFS)

DESCRIPTION: The facilities in this area are mostly used for ordnance storage as well as some testing/checkout of small ordnance devices, and rocket motor conditioning (cold soak)/build-up. These facilities are fully utilized and support multiple programs in the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE:FSA2

NO CHANGE TO THE JONATHAN DICKINSON

MISSILE TRACKING ANNEX (JDMTA)

(AIR FORCE/NAVY) (STUART, FL)

This installation is the latest of the Eastern Range (ER) Florida Annexes. It occupies approximately 12 acres inside the southern boundary of the Jonathan Dickinson State Park, just north of Jupiter, Florida. The land was acquired by the Air Force through a 50-year lease from the State Department of Natural Resources.

The basic mission of JDMTA is to serve as a tracking and control station for missiles, satellites, and space vehicles. The instrumentation to support this mission includes an AN/FPQ-14 radar, one TAA- 8, and four TAA-50 telemetry systems, two Daytron command control antennas, and a Trident Flight Test Support System (FTSS). Communications with CCAFS and other ER stations is by telephone, leased commercial telephone lines, and microwave relay.

The activities of this installation are consolidated into a centralized functional area consisting of an 18,443 SF instrumentation building, a 5,388 SF powerhouse, a 160 SF fire pump house, a 341 SF entry guardhouse, a 200-ft high microwave tower, and all of the various instrumentation systems' antennas. The only outlying site contains a 200-foot high boresight tower and a 128 SF instrumentation building.

Intermediate microwave relay sites between JDMTA and the Malabar Transmitter Annex have been established near Wabasso, Ft. Pierce, and Stuart, Florida. Each of these sites consists of a 200-foot high freestanding tower and a 400 SF concrete block instrumentation building, situated on approximately one acre of land, with an access easement. These relay sites provide the primary communication link between JDMTA and CCAFS with 48 voice channels to Malabar and then to CCAFS via PAFB. Leased commercial telephone lines provide a back-up to the microwave system.

See Figure PPLR-53.

FILE: JDMTA1

NO CHANGE TO THE JONATHAN DICKINSON MISSILE TRACKING ANNEX (JDMTA)

(AIR FORCE/NAVY) (STUART, FL)

DESCRIPTION: This facility consolidates radar, telemetry, and command/destruct functions in an optimal location in support of Eastern Range launches.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

NO CHANGE TO SATELLITE ASSEMBLY BUILDING (SAB)

(AIR FORCE) (CCAFS)

This facility supports the mission model with the processing of various classified payloads/space hardware. This facility has a large low bay and a large high bay that can maintain 100,000 class clean room standards. It also has a large administrative area. No hazardous operations can be conducted in the SAB due to the proximity to non-hazardous operations areas.

See Figure PPLR-54.

FILE: SAB1

NO CHANGE TO SATELLITE ASSEMBLY BUILDING (SAB)

(AIR FORCE) (CCAFS)

DESCRIPTION: The SAB supports the mission model by processing various classified payloads/space hardware. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: SAB

NO CHANGE TO DELTA HORIZONTAL PROCESSING FACILITY

(AIR FORCE) (CCAFS)

This facility is required to support the mission model for Delta launches. This facility is the only one designed for ordnance on the Delta's first stage and is sited for 13.27 lbs of 1.1 explosives. Processing time in this facility is one week. This facility is critical to the launch flow because it processes the first piece of hardware in the flow. Only one piece of hardware at a time can be processed which creates the potential for a bottleneck if a launch on need (LON) mission is required.

This is an environmentally controlled facility which consists of a manufacturing machine shop combined with one bay large enough to support one Delta booster stage.

See Figure PPLR-55.

FILE: DHPF1

NO CHANGE TO DELTA HORIZONTAL PROCESSING FACILITY
(AIR FORCE) (CCAFS)

DESCRIPTION: This facility supports the mission model for Delta launches and is used for the installation of ordnance and special instrumentation on the first stage. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: DHPF

NO CHANGE TO DELTA SECOND STAGE CHECKOUT FACILITY

(AIR FORCE) (CCAFS)

This facility is required to support the mission model for Delta launches. This facility houses equipment for second stage ordnance installation and erection preparation. Currently sited for 1.5 lbs of 1.1 explosives. The maximum capacity is two second stages.

See Figure PPLR-56.

FILE: DSSCF1

NO CHANGE TO DELTA SECOND STAGE CHECKOUT FACILITY

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model for Delta launches and is essential for the final testing and checkout of the second stage.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: DSSCF

NO CHANGE TO COMPLEX (CX) 47 LAUNCH CONTROL BUILDING

(AIR FORCE) (CCAFS)

This facility supports the mission model by controlling the launch of meteorological rockets ("met rockets") used to collect weather data in support of other launches in the mission model.

Wind data collected from met rockets are used to extend balloon/rawinsonde data to 150,000 feet. These data are required for the computation of the Range Safety Impact Prediction (RSIP) program.

This is a 14 X 14 foot building reinforced to provide protection for personnel from rocket debris. The launch pad is visible from the launch control building.

This facility has been and will continue to be made available to other users launching small rail launched rockets (e.g., E'Prime; Spaceport Florida).

NO CHANGE TO COMPLEX (CX)

LAUNCH CONTROL BUILDING

(AIR FORCE) (CCAFS)

DESCRIPTION: This building supports the mission model by controlling the launch of meteorological rockets ("met rockets") which provide weather data to multiple launch programs included in the mission model. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: CX47LCB

NO CHANGE TO COMMAND/CONTROL BUILDING

(AIR FORCE) (CCAFS)

This facility supports the mission model by providing a command/destruct capability up range on the Eastern Range. The purpose of this function is to insure the protection of life and property that may be threatened by an errant live missile launched from CCAFS or KSC.

See Figure PPLR-57.

FILE: CMDCTRL1

NO CHANGE TO COMMAND/CONTROL BUILDING

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility supports the mission model by providing a command/destruct capability to destroy errant launch vehicles for all launch programs. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: CMDCTRL

NO CHANGE TO DELTA FLIGHT HARDWARE STORAGE FACILITY

(AIR FORCE) (CCAFS)

This facility is required to support the mission model for Delta launches and is used to store first and second stages. Currently licensed for an unregulated amount of 1.4 explosives. The maximum amount of flight hardware that can be stored in this facility is 3 first stages and 3 second stages.

See Figure PPLR-58.

FILE: DFHSF1

NO CHANGE TO DELTA FLIGHT HARDWARE STORAGE FACILITY

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is required to support the mission model for Delta launches and is used to store first and second stages. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: DFHSF

NO CHANGE TO DELTA SOLID MOTOR STORAGE FACILITY

(AIR FORCE) (CCAFS)

This facility is required to support the mission model for Delta launches which requires the storage of two flight sets of strap-on solid rocket motors (SRMs). The SRMs being used are graphite epoxy motors (GEMs). This facility handles the overflow of SRMs stored at Area 57 which are constantly filled to capacity.

See Figure PPLR-59.

NO CHANGE TO DELTA SOLI(.IOTOR STORAGE FACILITY

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model for Delta launches and is required for the storage of strap-on solid rocket motors (SRMs).

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: DSMSF

NO CHANGE TO DELTA SECOND STAGE

HIGH PRESSURE TEST FACILITY

(AIR FORCE) (CCAFS)

This facility supports the mission model for Delta launches by providing an area for final checkout and testing of Delta II second stages (including ordnance installation).

Houses test equipment for leak checks and erection preparation; is licensed for 0.73 lbs of 1.1 explosives. Integrated with the Delta second stage checkout facility.

See Figure PPLR-60.

FILE: DSSHPTF1

NO CHANGE TO DELTA SECOND STAGE
HIGH PRESSURE TEST FACILITY
(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model for Delta launches by providing an area for the final checkout and testing of Delta II stages (including ordnance installation).

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

NO CHANGE TO SLC 36 BLOCKHOUSE

(AIR FORCE/GENERAL DYNAMICS) (CCAFS)

This facility supports the mission model by serving as the operations, control, and communications center for Atlas/Centaur launch operations. It also supports General Dynamics' commercial Atlas launch program. This facility is a two story, blast-proof building with support facilities on the first floor and launch command and control consoles on the second floor. It contains all the necessary electrical, command, and communications equipment required to operate, monitor, and control test and launch operations remotely.

See Figure PPLR-61.

File: 36BLKHS1

NO CHANGE TO SLC 36 BLOCKHOUSE

(AIR FORCE/GENERAL DYNAMICS) (CCAFS)

DESCRIPTION: This facility supports the mission model by serving as the operations, control, and communications center for Atlas launch operations. This blockhouse supports both the Air Force Atlas program and General Dynamics' commercial atlas program and is fully utilized.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

File: 36BLKHS

NO CHANGE TO NAVSTAR PROCESSING FACILITY (NPF)

(AIR FORCE) (CCAFS)

This facility supports the mission model for the launch of satellites as part of the Global Positioning System (GPS). Presently this facility is fully committed to the GPS IIA program and is being used to full capacity. It has also been committed to the GPS IIR program for spacecraft storage through the year 2006. This facility consists of a main bay, high bay, and air lock (all meet 100,000 class clean room requirements).

See Figure PPLR-62.

FILE: NPF1

NO CHANGE TO NAVSTAR PROCESSING FACILITY (NPF)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model by processing and storing Global Positioning System (GPS) satellites and related payload assist modules (PAMs).

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: NPF

NO CHANGE TO NAVSTAR SATELLITE STORAGE FACILITY
(AIR FORCE/DOT) (CCAFS)

The NAVSTAR Satellite Storage Facility is a 4,002 square-foot concrete block structure located within the confines of the security fenced Satellite Processing Area (SPA). It was constructed in 1962 and is scheduled for air conditioner/door/roof repairs/replacement starting April '94 with an estimated completion of June '94. Under normal conditions, the facility is suitable for satellite storage, assembly, and checkout of small payloads and components. It can maintain 100,000 class clean room standards and has both a 2-1/2-ton and 10-ton bridge crane in the processing area. Backup power can be provided by portable generator.

Presently, the facility is used by the GPS Block IIA program to store ground support equipment. The facility is not being used for satellite storage as structural problems have been identified with the doors. The repair contract mentioned above will correct this problem and return facility capabilities back to normal state.

The GPS Block IIR program has requested use of this facility. The GPS Block IIA program has a continuous need to store ground support equipment. Commercial users have shown interest in processing through this facility. They have made multi-site visits but to date none have formally requested use. This facility will continue to be available for shared use.

See Figure PPLR-86.

NO CHANGE TO NAVSTAR S. .ELLITE STORAGE FACILITY
(AIR FORCE/DOT) (CCAFS)

DESCRIPTION: This facility supports the mission model by storing ground support equipment for the Global Positioning System (GPS) program. It also has the capability for satellite storage, assembly, and checkout of small payloads. Commercial users have shown an interest in processing through this facility.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** 03/29/94 **CAT:** 1B

NO CHANGE FOR HANGAR M

(AIR FORCE) (CCAFS)

This facility is required to support the mission model for Delta launches and is used to house the first stage, second stage, fairing, and inter stage upon arrival from the assembly plant. Also supports loading and unloading of stages, ordnance installation, solid motor separation thruster motor build-up, build-up of flight batteries, proof-loading and storage of fixtures, and support offices.

This facility houses equipment (cranes, trailers, etc.) and battery laboratories used to receive and inspect flight hardware. This facility is licensed for 42 grams of 1.2 explosives. Flight hardware capacity is 5 fairings, 8 inter stages, 2 first stages, and 2 second stages. Flight hardware is continually moving through this facility in preparation for launches. This facility is expected to operate at maximum capacity in the 1995 timeframe.

See Figure PPLR-63.

FILE: HGRM1

NO CHANGE FOR HANGAR M

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility supports the mission model for the Delta launch program and is used to house the first stage, second stage, firing, and interstage upon arrival from the assembly plant. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: HGRM

NO CHANGE FOR DELTA MISSION CHECKOUT (DMCO) FACILITY

(AIR FORCE) (CCAFS)

The DMCO is an environmentally controlled structure that houses all command, control, and monitoring equipment for the Delta II booster stage and second stage during receipt, inspection, processing, and initial testing. This includes control consoles, communications consoles, and a telemetry laboratory. It serves as operations control for the area. Maximum capacity is two first stages and two second stages. Processing time is approximately five weeks. Percent use of capacity will vary with the launch schedule and future launch on need requirements.

See Figure PPLR-64.

FILE: DMCO1

CHANGE FOR DELTA MISSION CHECKOUT (DMCO) FACILITY

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility supports the mission model for Delta launches and is used for integration and checkout of flight hardware. Dual composite tests are performed here for the first and second stage; these tests cannot be performed in any other facility at CCAFS. This facility also supports flight hardware launched from Vandenberg AFB. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: DMCO

NO CHANGE TO DSCS PROCESSING FACILITY

(AIR FORCE) (CCAFS)

This facility supports the mission model and is required to support multiple classes of payloads. used to process defense satellite communication system (DSCS) satellites and Global Positioning System (GPS)-Block IIR satellites.

This is a world class processing facility that has all of the capabilities necessary to process a satellite from the time it is received until it is ready to go to the pad. It consists of four 100,000 class clean rooms with air showers; a technical shop; data analysis center; ground and security station; bonded storage and break room; and a communications equipment room. No administrative space is available.

See Figure PPLR-65.

NO CHANGE TO DSCS PROCESSING FACILITY

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is required to support the mission model and is used to process all classes of payloads. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

File: DPF

NO CHANGE TO PROPELLANT SERVICING FACILITY (PSF)

(AIR FORCE) (CCAFS)

This facility supports the mission model by providing a fueling capability for multiple payload and upper stage [programs (e.g., Global Positioning System, Inertial Upper Stage, Centaur, various classified payloads). This facility is already heavily used and is operating at maximum capacity.

See Figure PPLR-66.

FILE: PSF1

NO CHANGE TO PROPELLANT SERVICING FACILITY (PSF)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model by providing a fueling capability for multiple payload/upper stage programs (e.g., Global Positioning System, Inertial Upper Stage, Centaur, and various classified programs).

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: PSF

NO CHANGE TO SLC 17A AND B

(AIR FORCE) (CCAFS)

This space launch complex is required to support the mission model for the Delta launch program. The SLC is made up of two launch pads (A&B), mobile service towers, and support buildings/systems as follows: ground systems, communications, launcher building which houses liquid nitrogen system, air-conditioning room and air-conditioning building, fixed umbilical towers, gaseous nitrogen (GN2) system, second stage propellant loading system, water system,fire protection, cable ways, acid storage/change building, ground support equipment storage, fluid storage, and auxiliary facilities.

NO CHANGE TO SLC 17A AND B

(AIR FORCE) (CCAFS)

DESCRIPTION: This space launch complex (SLC) includes two launch pads (A&B) both of which are fully utilized and are needed to support the mission model for Delta launches.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 12/06/93 **REV:** **CAT:** 1B

FILE: SLC17AB

NO CHANGE TO USE OF SLC 36B

(AIR FORCE/GENERAL DYNAMICS) (CCAFS)

General Dynamics Space Systems Division (GDSSD) performed and funded major renovations to SLC 36B in support of their commercial launch program. This pad can support the launch of all versions of the Atlas vehicle whereas SLC 36A (which supports the Air Force Atlas program) can only accommodate the Atlas II version. There is no opportunity to close either SLC 36A or 36B because one pad alone cannot support both the mission model and the commercial Atlas launch program. Even if one pad was closed the Government would still end up paying all of the O&M for one launch pad because the Commercial Space Launch Act does not require commercial users to pay fixed O&M costs on facilities shared with the Government.

See Figure PPLR-61.

NO CHANGE TO USE OF SLC 36B

(AIR FORCE/GENERAL DYNAMICS) (CCAFS)

DESCRIPTION: Space launch complex (SLC) 36B is assigned to General Dynamics Space Systems Division (GDSSD) in support of their commercial launch program. This facility is required to support the commercial mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: SLC36B

NO CHANGE TO DELTA SOLID MOTOR STORAGE FACILITY (AREA 57)

(AIR FORCE) (CCAFS)

This facility is sited for 3000, lbs of 1.1 explosives or 30,000 lbs of 1.1 explosives. The maximum storage capacity is nine solid rocket motors (SRMs). This facility is fully utilized. Percent use of capacity will vary with launch rate and will become even more critical for future launch on need (LON) requirements.

See Figure PPLR-67.

FILE: DSMS1

NO CHANGE TO DELTA SOLID MOTOR STORAGE FACILITY (AREA 57)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model for Delta launches and is required to store flight ready solid rocket motors (SRMs).

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: DSMS

NO CHANGE TO DELTA SOLID MOTOR ASSEMBLY FACILITY (AREA 57)

(AIR FORCE) (CCAFS)

This facility is licensed for 300,000 lbs of 1.3 explosives or 30,000 lbs of 1.1 explosives and is uniquely designed to process Delta solid rocket motors (SRMs). Maximum capacity is 9 SRMs. This facility is fully utilized; percent use of capacity will vary with launch rate and will need to be at full capacity to meet launch on need (LON) requirements.

See Figure PPLR-68.

FILE: DSMA1

CHANGE TO DELTA SOLID MOTOR ASSEMBLY FACILITY (AREA 57)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility is fully utilized and supports the mission model for the Delta launch program and is used to checkout Delta II solid rocket motors (SRMs), install flight termination system ordnance, and store ordnance equipped SRMs.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

FILE: DSMA

NO CHANGE TO MET ROCKET LAUNCH CONTROL BUILDING

(AIR FORCE/NAVY) (ASCENSION)

The U.S. Navy requires data collected from this facility to analyze the performance of Trident submarine-launched ballistic missiles. Meteorological rockets are required only for missile bodies reentering in the vicinity of Ascension Island.

File: ASCMRL1

NO CHANGE TO MET ROCKET LAUNCH CONTROL BUILDING

(AIR FORCE/NAVY) (ASCENSION)

DESCRIPTION: This facility supports the collection of weather data used by the U.S. Navy to analyze the performance of Trident submarine-launched ballistic missiles. This facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: - No change is recommended by the LRPP team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 1B

File: ASCMRL

NO CHANGE TO MET ROCKET MUNITIONS STORAGE FACILITY
(AIR FORCE/NAVY/UK) (ASCENSION)

This facility is used to store rockets in support of the meteorological rocket program to meet U.S. Navy requirements for weather data used to analyze the performance of Trident submarine-launched ballistic missiles. Although this facility is not being used to capacity, it is located on a part of the island that is isolated from the main base and other potential users. It will remain available for shared use but will not likely be shared because of its remote location.

NO CHANGE TO MET ROCKET ..UNITIONS STORAGE FACILITY
(AIR FORCE/NAVY/UK) (ASCENSION)

DESCRIPTION: The meteorological ("met") rocket storage facility on Ascension Island is not being utilized to full capacity and could be used to store other munitions/ordnance. Other users should be sought. The met rocket program supports the U.S. Navy requirement for weather data used to analyze the performance of Trident submarine-launched ballistic missiles.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 03/29/94 **CAT:** 1B

ABANDONED AND ACTIVE LAUNCH SILOS
(DOD, COMMERCIAL) (VAFB)

The Titan, Atlas, and Minuteman launch silos were designed to support intercontinental ballistic missile launch tests. Buildings 1520, 1875, 1935, 1962, 1964, 1965, 1966, 1981, and 1986 are abandoned Titan, Atlas, or Minuteman launch silos. The Titan silos are 55' wide and 117' deep. The Minuteman silos are 12' wide and 87' deep. Some were taken out of commission as early as 1970. Most have been decommissioned and stripped and are not capable of supporting launch operations. All are approved for Class 1.1 explosives ranging from 7,400 (Minuteman) to 52,000 lbs. (Atlas) and have a Q.D. Circle of 1,200-1,875 feet. It is very costly to upgrade these facilities for operational use.

Buildings 1963, 1967, 1971, 1972, 1976, 1977, 1980, and 1993 are operational Minuteman and Peacekeeper silos. These facilities are START inspectable. The launch tube is 12' wide and 87' deep and support a launch azimuth of 264-280 degrees. The RSLP launch pads have a protective shelter on the pad. Once missions are complete at these launch silos, the pad will be closed and the O&M discontinued. Sites for Minuteman's are approved for Class 1.1 explosives with a Quantity Distance Circle of 1,200 feet for a TNT equivalent of 7,400 lbs. The Peacekeeper silos are approved for 225,000 lbs. of TNT equivalence of Class 1.1 propellants with a Q.D. Circle of 2,965 feet. Conversion to small space launch pad operations could be accomplished within five million dollars.

Buildings 1520, 1875, 1935, 1962, 1964, 1965, 1966, 1981, and 1986 should remain abandoned. Buildings 1963, 1967, 1971, 1972, 1976, 1977, 1980, and 1993 should be abandoned or converted to small space launch pads following their mission model completion (1994 - 1999).

See Figure PPLR-69.

ABANDON LAUNCH SILOS
(DOD, COMMERCIAL) (VAFB)

DESCRIPTION: Buildings 1520, 1875, 1935, 1962, 1964, 1965, 1966, 1981, and 1986 are abandoned Titan, Atlas, and Minuteman Launch Silos. Buildings 1963, 1967, 1971, 1972, 1976, 1977, 1980, 1993 are operational Minuteman and Peacekeeper Silos. These facilities will be abandoned when they are no longer supporting the mission model.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: Leave abandoned facilities abandoned. Abandon/convert active facilities once mission model is complete.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 1B

NO CHANGE TO THE COMMUNICATIONS DISTRIBUTION AND SWITCHING CENTER (CD&SC)
(NASA) (KSC)

The Communications Distribution and Switching Center (CD&SC) is a 33,395 square-foot, one-story building located in the KSC Industrial Area. It was built in 1964 and has been in continuous operation as a major segment of the KSC communications system. All incoming and outgoing telecommunications are transmitted through this facility. It contains equipment for monitoring and switching functions for voice, data, and video circuits passing through the CD&SC. It also contains wideband amplifier equipment, administrative telephone switching equipment, telephone switchboard, and interface equipment between NASA and Southern Bell. To minimize loss of test and operational communications, the Center provides control to ensure maintenance of transmission quality levels and maximum circuit availability.

The CD&SC is the only telecommunications switching facility on KSC and is, therefore, a mission-critical asset required to support the 8 Shuttle flights per year mission model.

NO CHANGE TO THE COMMUNICATIONS DISTRIBUTION AND SWITCHING CENTER (CD&SC)
(NASA) (KSC)

DESCRIPTION: The mission of the Communications Distribution and Switching Center (CD&SC) is very complex and critical to the operation of KSC. The CD&SC is a major segment of the KSC communication system with all incoming and outgoing telecommunications transmitted through this facility. The CD&SC contains all the video and audio switching equipment necessary for connecting NASA facilities with Southern Bell Telephone and Telegraph trunk lines from the Cocoa exchange, the U.S. Air Force underground cables from Cape Canaveral Air Force Station, and the Satellite Earth Stations located north and east of the CD&SC facility.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the Shuttle mission model.

DATE: 2/24/94 **REV:** **CAT:** 1B

NO CHANGE TO THE DEVELOPMENT TEST LAB/M7-581
(NASA) (KSC)

The Development Test Laboratory consists of a NASA Civil Service staffed, 16,000-square-foot facility and provides a machine shop, welding shop, pneumatics shop, woodworking shop, and an electrical/electronic shop. The laboratory receives approximately 100 project requests per year from various programs throughout the Center. These requests are to fabricate unique designs and modifications to existing systems and equipment to reduce operations timelines and cost and improve safety and reliability. The facility is fully utilized in support of the Shuttle, Space Station, and payload projects.

NO CHANGE TO THE DEVELOPMENT TEST LAB/M7-581
(NASA) (KSC)

DESCRIPTION: The Development Test Laboratory provides a unique, quick-response, world-class capability to fabricate and test a wide variety of mechanical, structural, and electrical/electronic components and systems. An example was the recent realtime support for resolution of the LH_2 leaks during several Shuttle launches. The laboratory contains a machine shop, welding shop, pneumatics shop, woodworking shop, and an electrical/electronics shop and provides support to the Shuttle, Space Station, and payload programs.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the Shuttle mission model.

DATE: 3/8/94 **REV:** **CAT:** 1B

NO CHANGE TO THE MISSILE RESEARCH TEST BUILDING (MRTB-II)
(AIR FORCE/NASA/DOT) (CCAFS)

MRTB-II is a hazardous solid ordnance processing facility located at Cape Canaveral Air Force Station (CCAFS) in the fuel storage area (FSA) number 5. The building is 41 feet long, 29 feet wide, and 36 feet high and will soon have a 20-ton bridge crane capability. Building construction was originally funded by NASA and has, therefore, been carried on NASA real property records. However, this facility has always been assigned to the Air Force for the support of multiple DoD/NASA programs since NASA usage has been light. This facility is now in the process of being turned over to the Air Force for real property accountability and will continue to be used for processing payload kick motors such as the NAVSTAR series, INTELSAT VI program, GALAXY, Geotail, and Aurora.

NO CHANGE TO THE MISSILE RESEARCH TEST BUILDING (MRTB-II)
(AIR FORCE/NASA/DOT) (CCAFS)

DESCRIPTION: The Missile Research Test Building (MRTB) is located on Cape Canaveral Air Force Station (CCAFS). This facility supports the mission model and will be used to process payload kick motors. Presently this facility is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 03/29/94 **CAT:** 1B

NO CHANGE TO HANGAR J
(AIR FORCE) (CCAFS)

This facility supports the mission model for Atlas launches and is used for launch vehicle processing, logistics, and administrative purposes. It is also used to assemble, modify, and test ground support equipment (GSE). Currently this facility is also shared with Titan/Centaur. The administrative offices are at 100 percent capacity, but utilization of hangar bay floor space is projected at less than 25 percent based on the delivery and processing schedule of critical flight hardware.

Sharing of the hangar bay floor area with other programs is not deemed practical at this time. The schedule for hardware delivery is not always predictable. The high bay area must be available to receive the hardware when it comes in.

See Figure PPLR-85.

NO CHANGE .O HANGAR J
(AIR FORCE) (CCAFS)

DESCRIPTION: Hangar J is currently an Atlas and Titan/Centaur staging/storage area for launch vehicle processing, logistics, and administrative support. This facility is required to support the mission model, but is not fully utilized and has potential for mission model growth.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to support the mission model.

DATE: 11/18/93 **REV:** 03/29/94 **CAT:** 1B

NO CHANGE TO BIG THREE NITROGEN PRODUCTION PLANT
(NASA) (KSC)

Big Three is an industry owned and operated gaseous nitrogen air separation and liquid conversion plant located at the southern boundary of KSC.

GN_2 is used for purging operations, propellant tank conditioning, engine conditioning, and leak checks and to "safe" LO_2 systems by feeding GN_2 through them to inert any LO_2 residue. It is also used for operating valves in pneumatic systems and other disconnect devices. GN_2 is provided by a pipeline from the Big Three plant to meter stations at KSC and CCAFS forming a continuous loop around the area. The KSC pipeline network (including various storage batteries) provides approximately 5,000,000 standard cubic feet of usable GN_2 storage. The Big Three plant supplies 7,000-psi nitrogen for routine and launch support.

The facility was built in 1970 and is dedicated to supply KSC's needs. If this facility is not used, GN_2 supply to KSC and CCAFS would have to be provided by over-the-road tanker trucks at a much higher unit cost.

NO CHANGE TO BIG THREE N..ROGEN PRODUCTION PLANT
(NASA) (KSC)

DESCRIPTION: Big Three is an industry owned and operated gaseous nitrogen air separation and liquid conversion plant. A high-pressure pipeline system links Big Three with various users at KSC and CCAFS. It supplies 7,000-psi nitrogen for routine and launch support. Big Three is a dedicated plant which is directly involved in supplying GN_2 during launch preparation and countdown.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the Shuttle mission model.

DATE: 3/10/94 **REV:** **CAT:** 1B

P1/WP51/STENNIS.1B

NO CHANGE TO THE CONVERTER/COMPRESSOR FACILITY (CCF)
(NASA) (KSC)

The Converter/Compressor Facility (CCF) is the interface point for the gaseous helium and gaseous nitrogen pipelines distributing products to the LC39 area. It maintains supply pressure in the cross-country lines feeding the launch pads and various other facilities. The equipment used in this facility is used throughout the industry for managing high-pressure/high-volume propellants. This facility is in continual operation supporting day-to-day propellant requirements but is elevated to a higher production level during launch operations and testing. This area is also configured to accommodate cryogenic propellants and supports filling of mobile equipment used throughout KSC and CCAFS.

KSC is the largest user in the U.S. of helium and it is mostly supplied from the CCF. This is a unique facility due to the configuration to support launch processing using either gaseous or cryogenic products.

NO CHANGE TO THE CONVERTL ./COMPRESSOR FACILITY (CCF)
(NASA) (KSC)

DESCRIPTION: The Converter/Compressor Facility is the Launch Complex 39 (LC39) distribution point for gaseous helium and nitrogen to the launch pads and other support facilities in the area. It contains 7 high-pressure helium compressors and other related support equipment. It also contains pressure reducing equipment for gaseous nitrogen supply to the LC39 area and also supports the filling of mobile equipment used throughout KSC and CCAFS.

PAYOFF POTENTIAL:

COST SUMMARY:

PROS:

CONS:

STEPS TO MAKE IT HAPPEN:

TASK GROUP RECOMMENDATION: No change is recommended by the PPLR team. This facility is required to meet the Shuttle mission model.

DATE: 3/10/94 **REV:** **CAT:** 1B

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY

WORKING GROUP

CAT 1B

FACILITY PHOTOGRAPHS

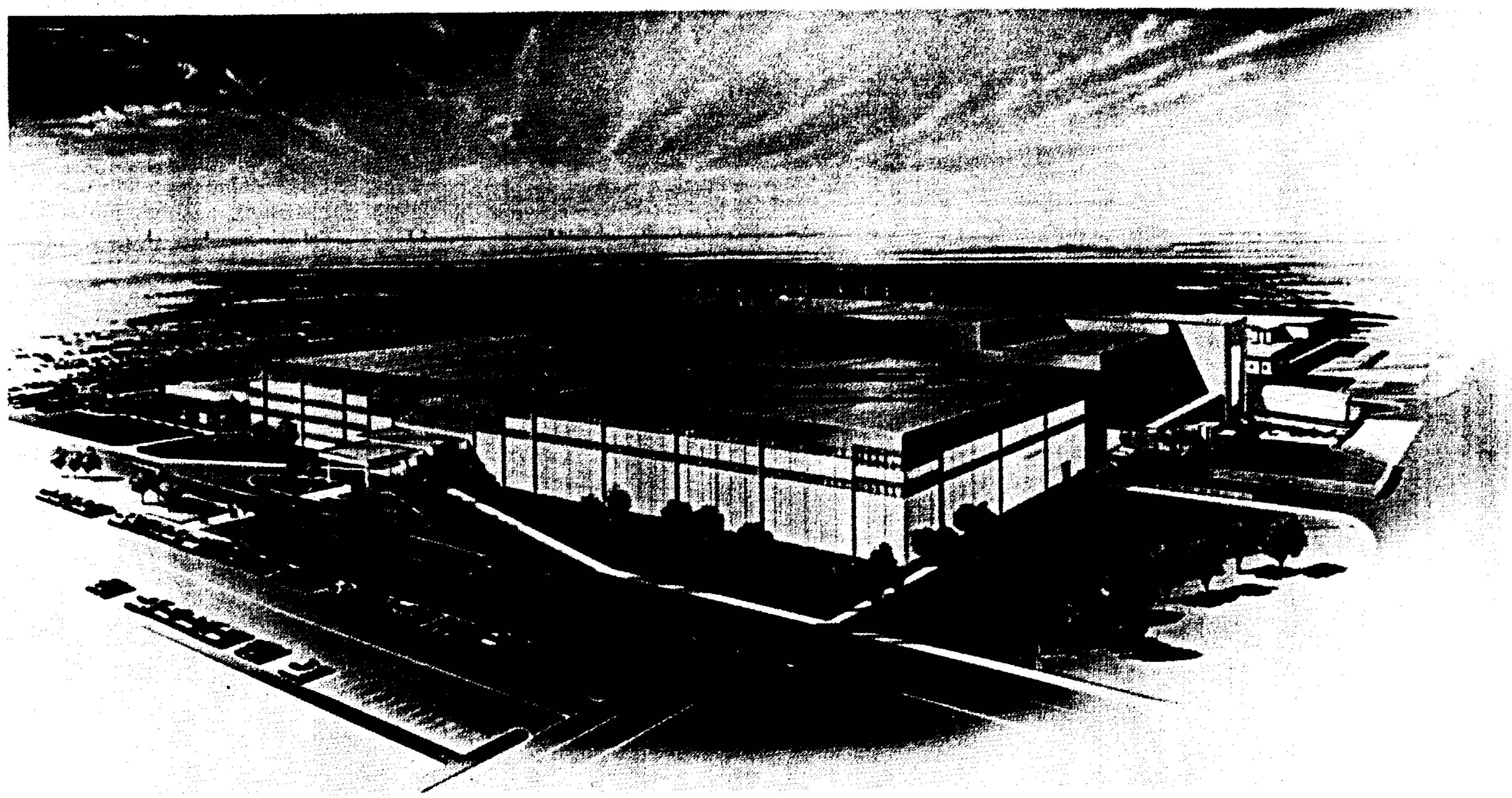


Figure PPLR-21.

Space Station Processing Facility (SSPF) (KSC) (Artist Concept)

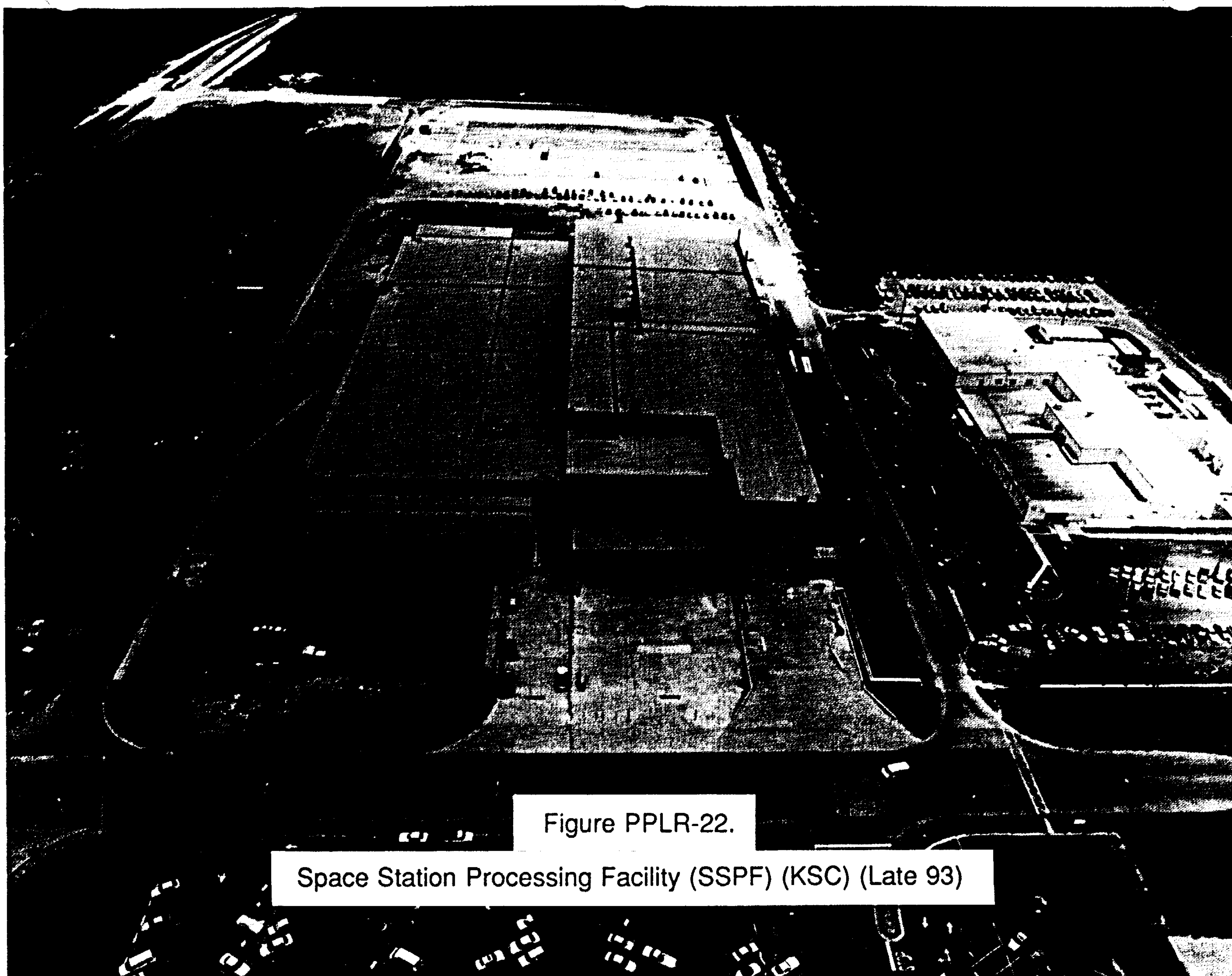


Figure PPLR-22.

Space Station Processing Facility (SSPF) (KSC) (Late 93)

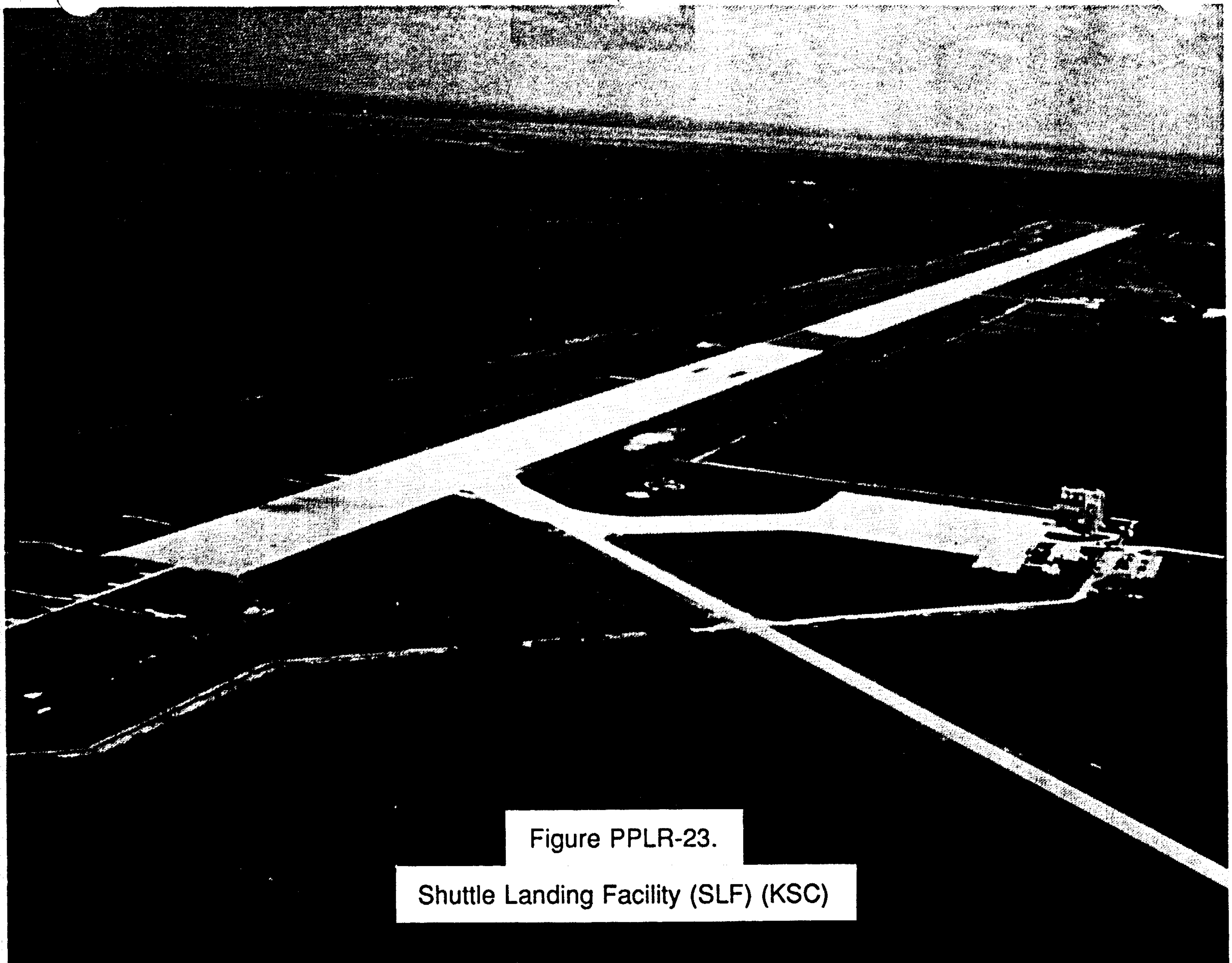


Figure PPLR-23.

Shuttle Landing Facility (SLF) (KSC)

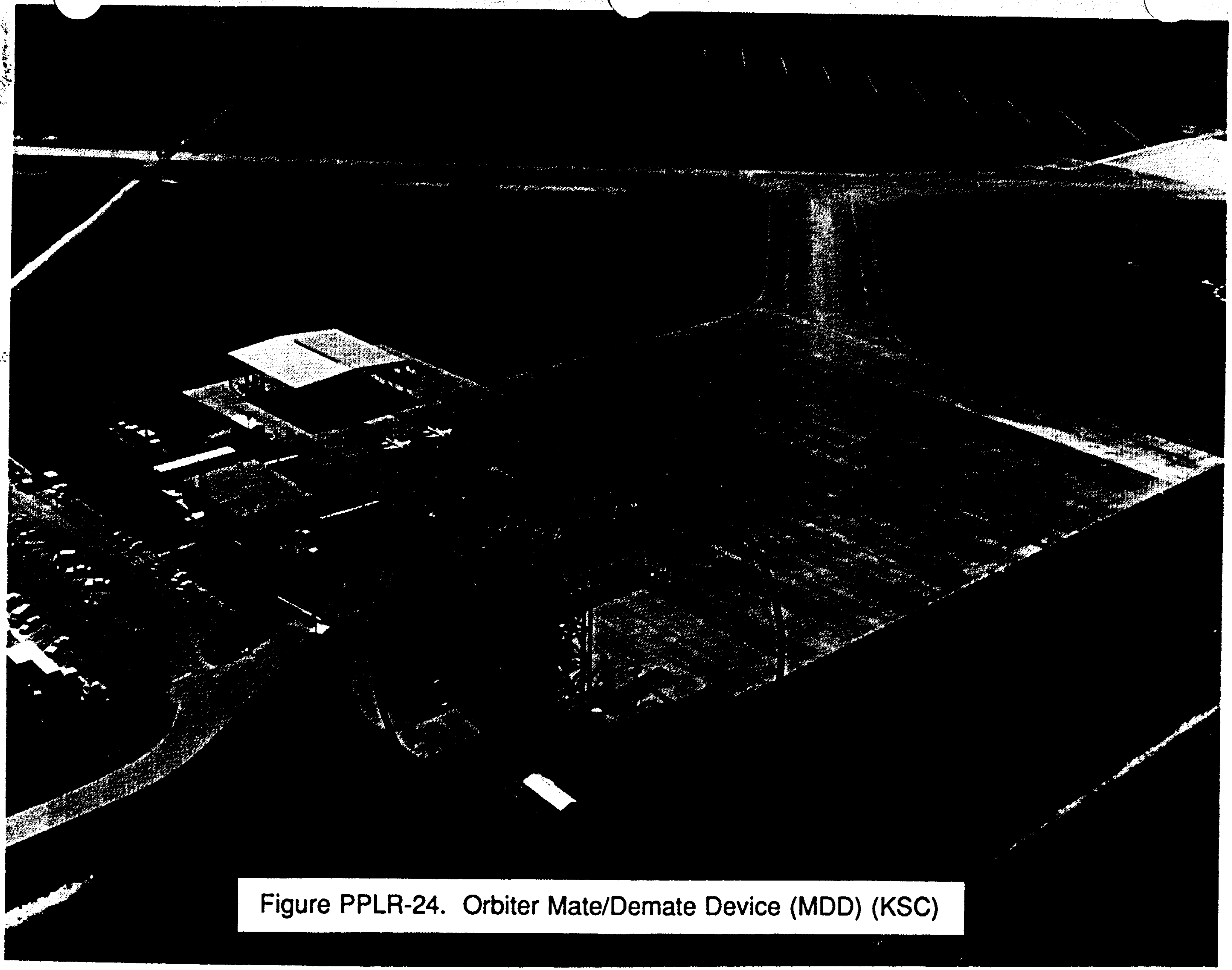
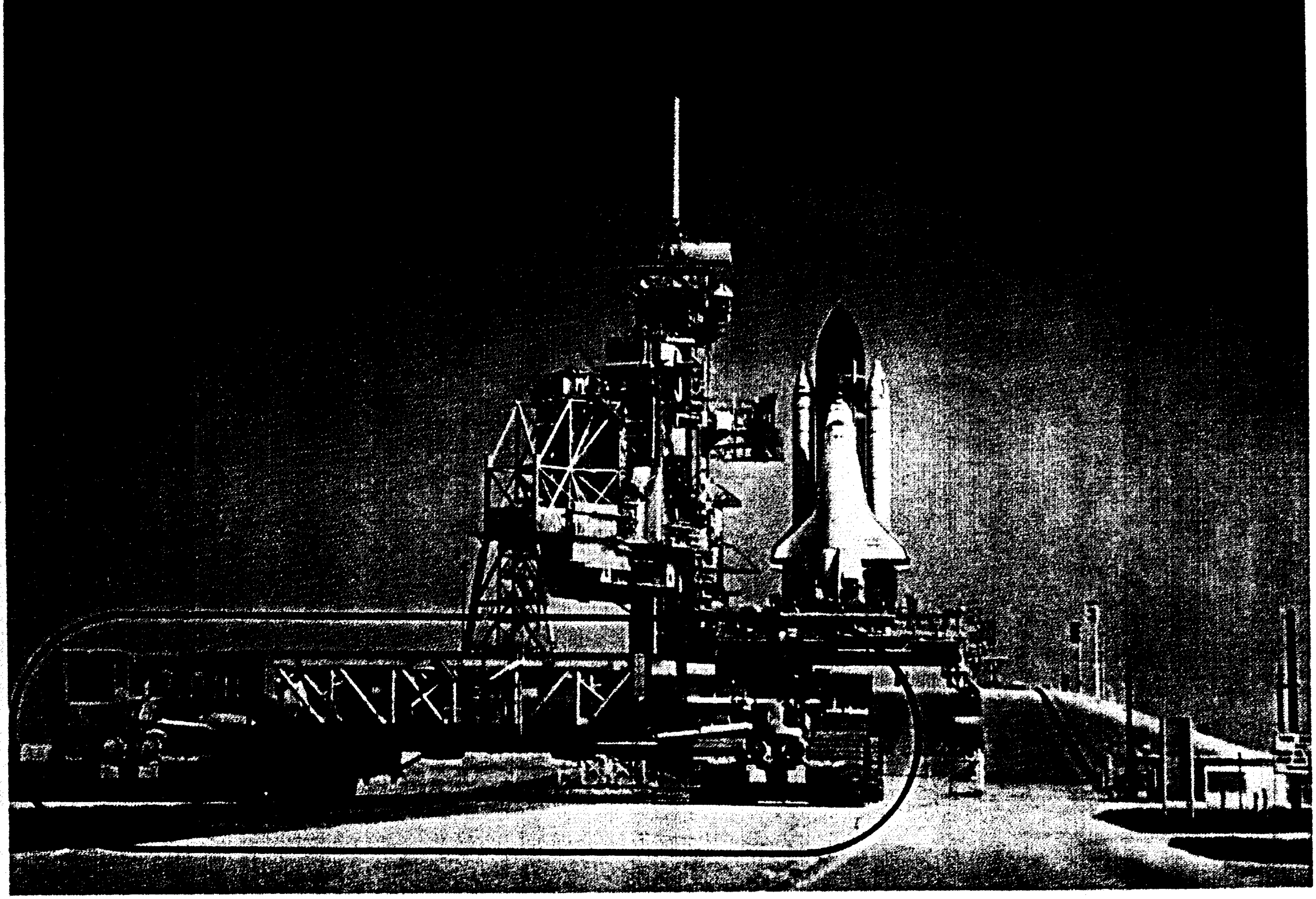


Figure PPLR-24. Orbiter Mate/Demate Device (MDD) (KSC)

Figure PPLR-25. Shuttle Crawler Transporter (CT) (KSC)



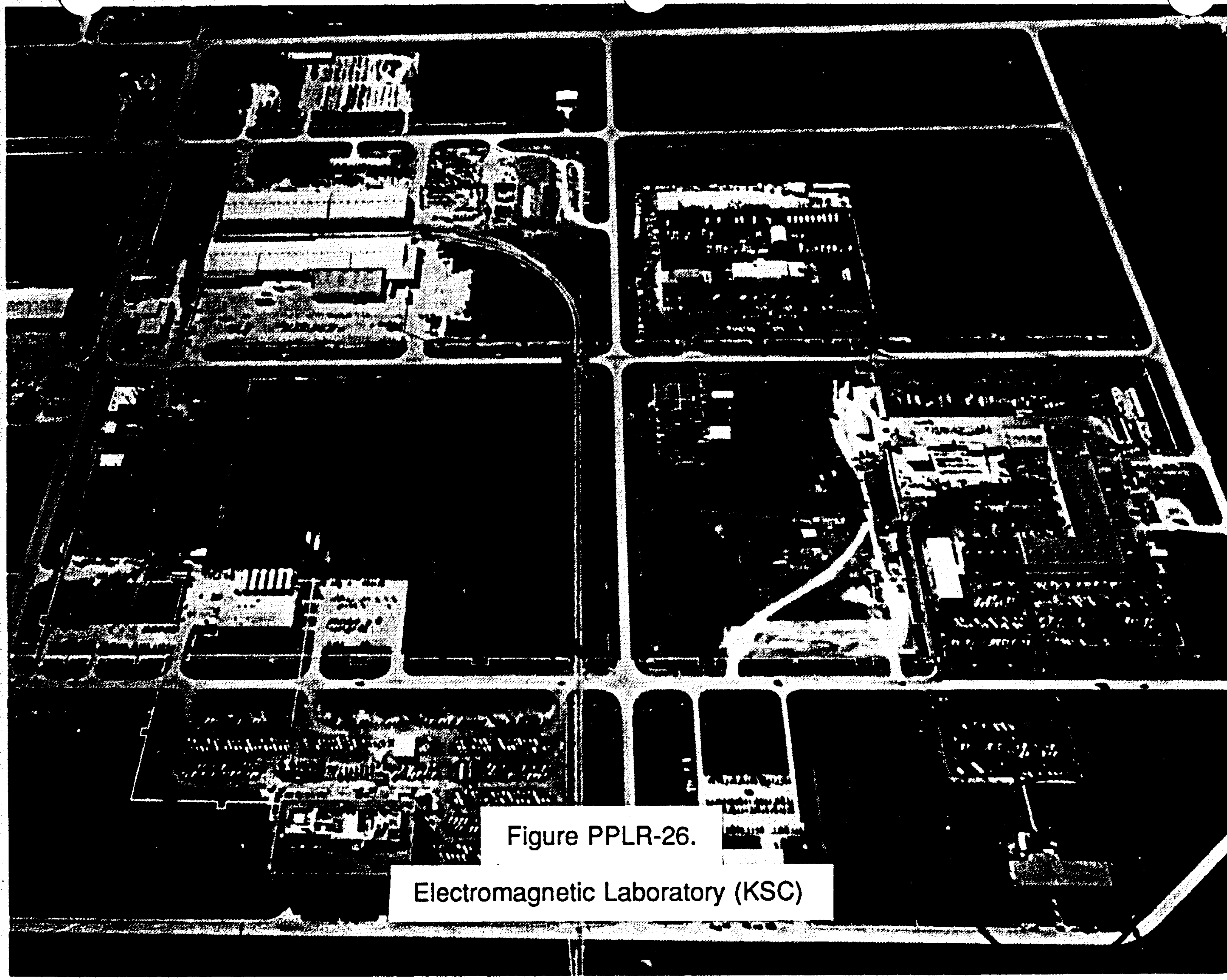


Figure PPLR-26.

Electromagnetic Laboratory (KSC)

Figure PPLR-27.

Engineering Development Laboratory (EDL) (KSC)

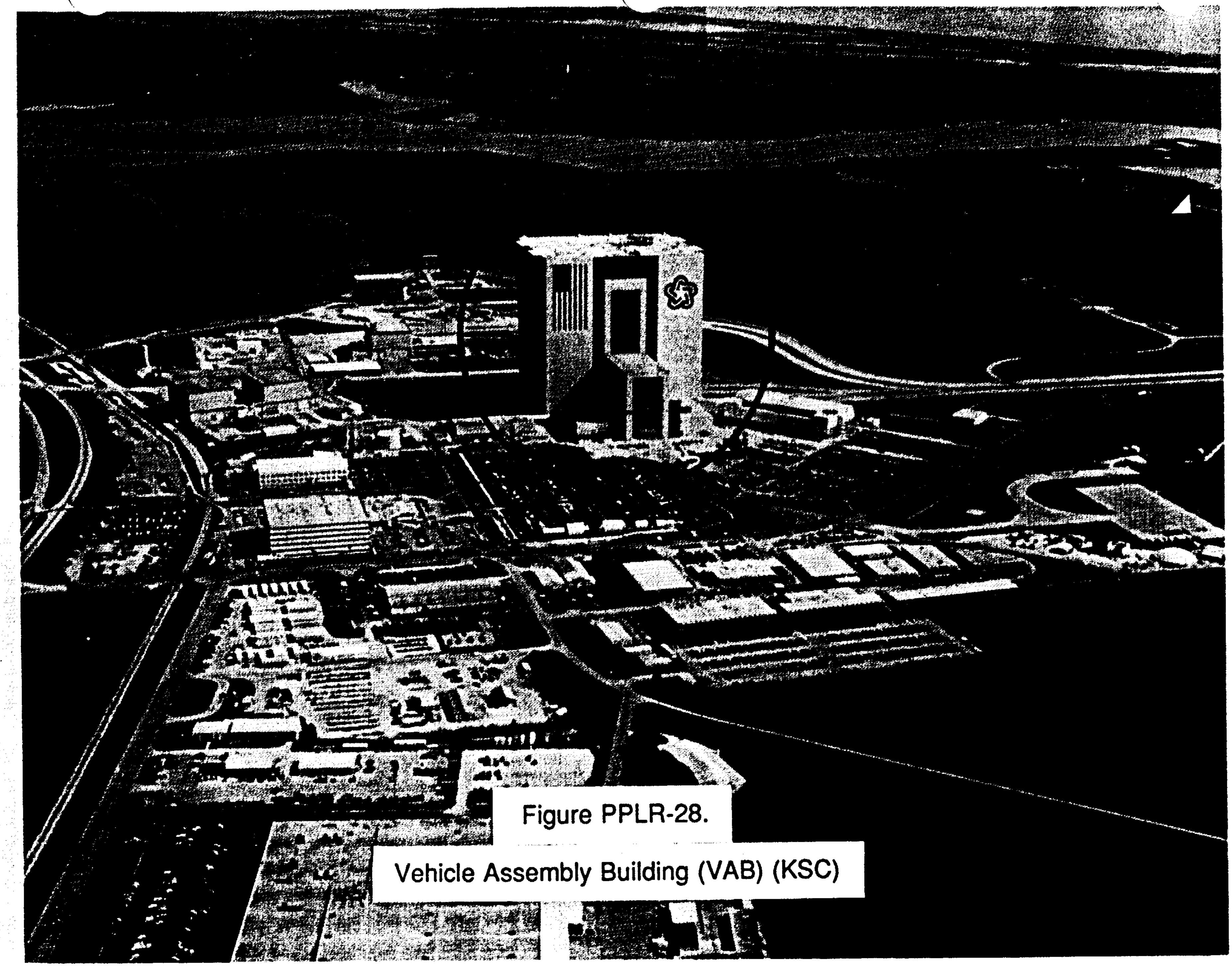
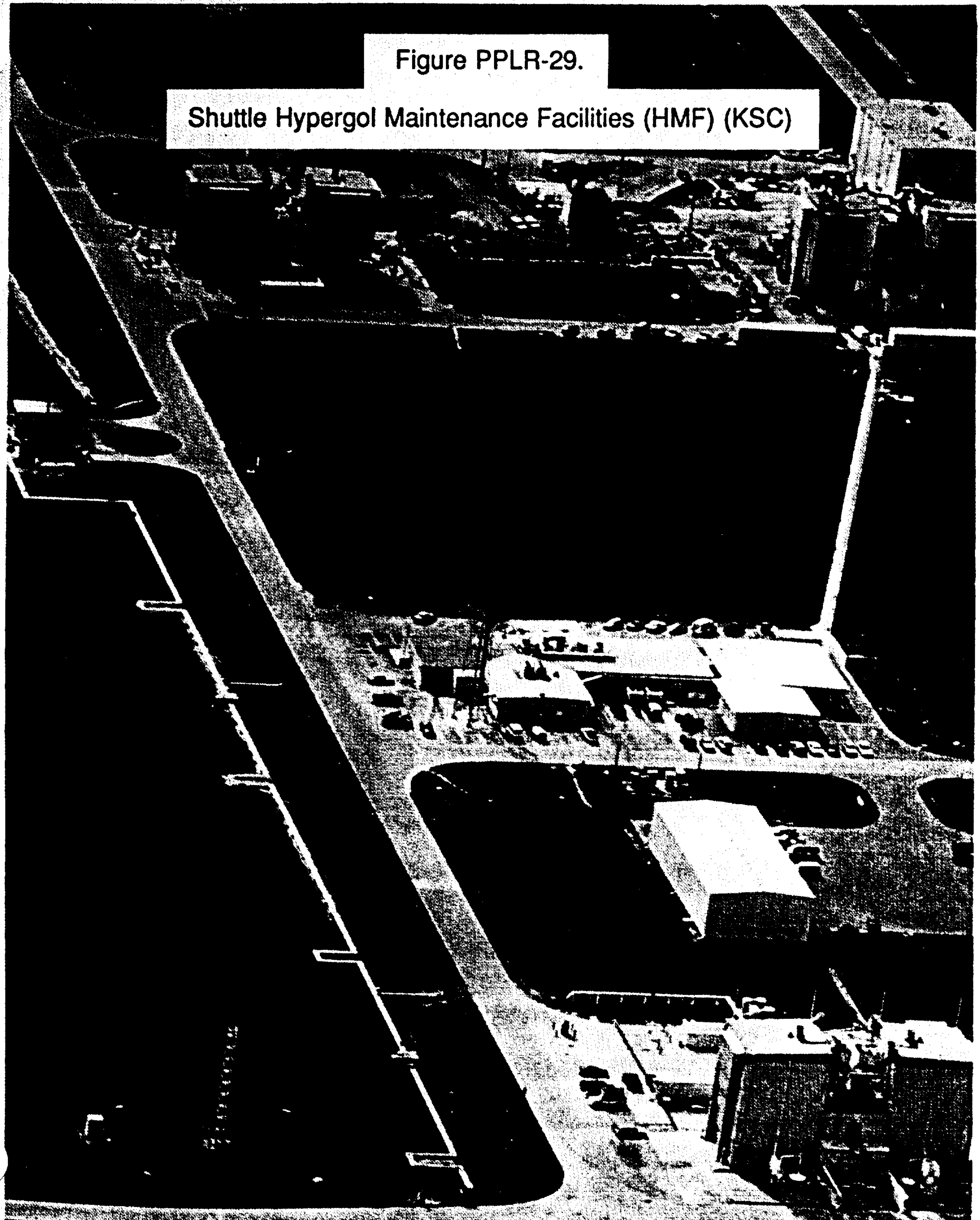


Figure PPLR-28.

Vehicle Assembly Building (VAB) (KSC)

Figure PPLR-29.

Shuttle Hypergol Maintenance Facilities (HMF) (KSC)



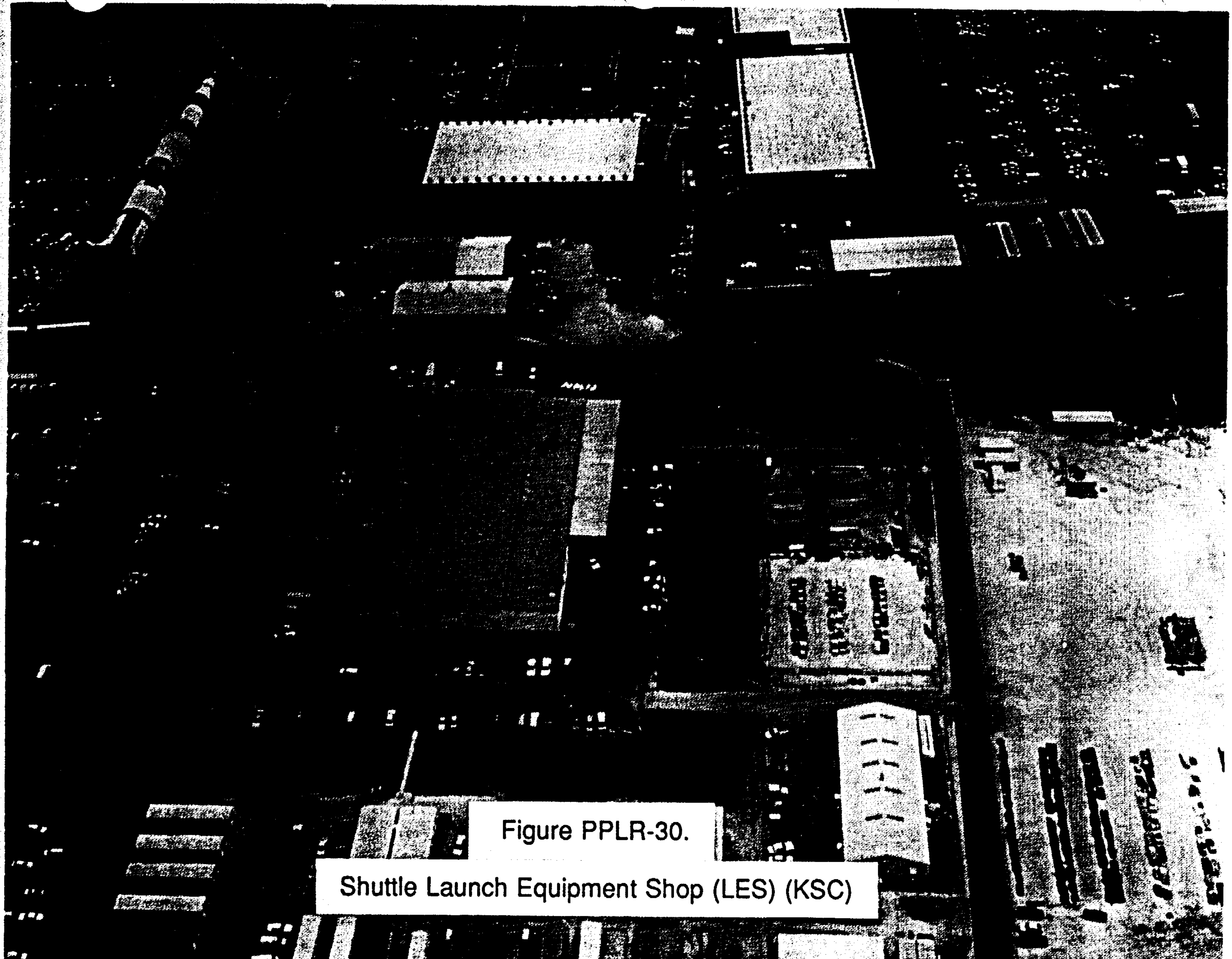


Figure PPLR-30.

Shuttle Launch Equipment Shop (LES) (KSC)

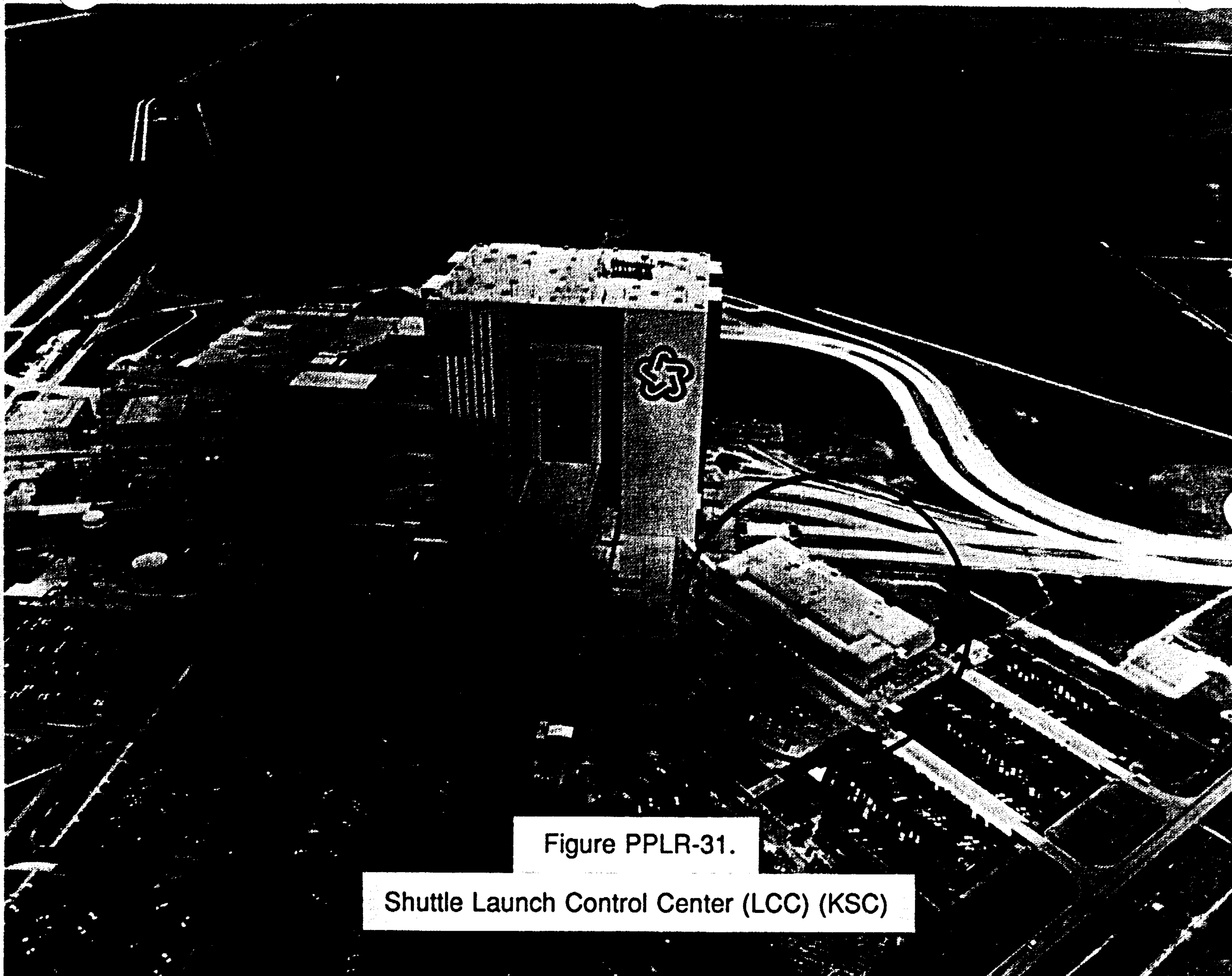


Figure PPLR-31.

Shuttle Launch Control Center (LCC) (KSC)

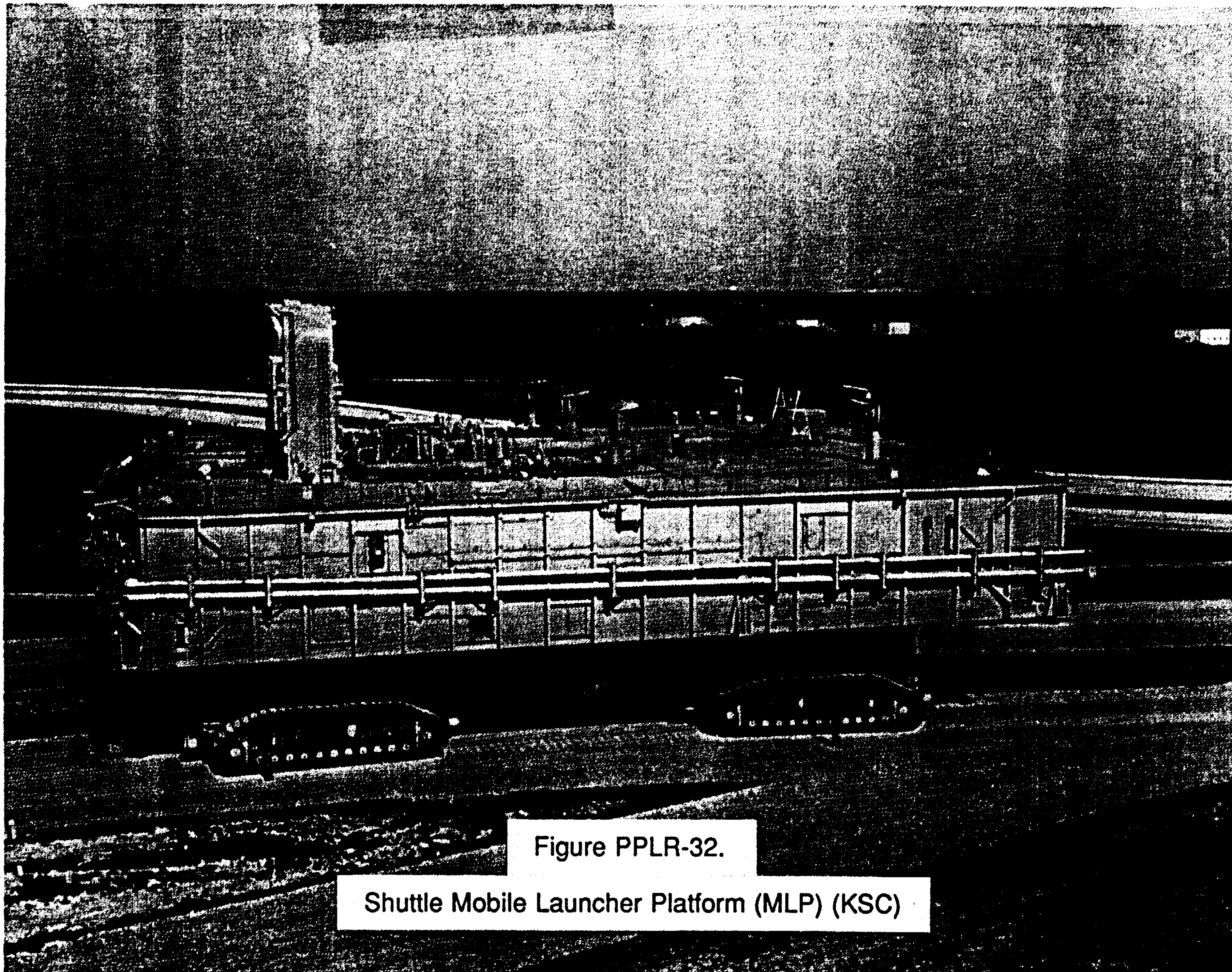


Figure PPLR-32.

Shuttle Mobile Launcher Platform (MLP) (KSC)

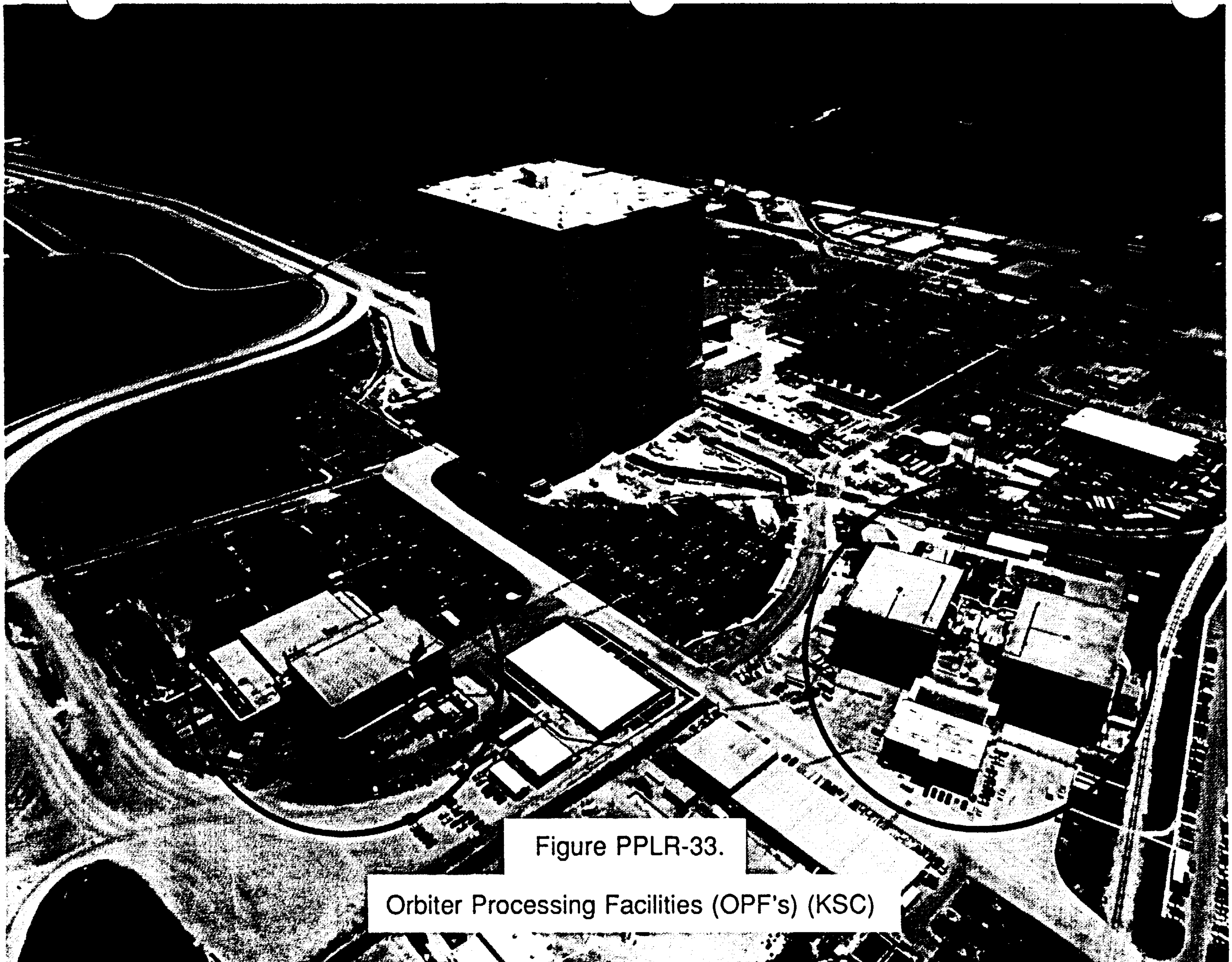


Figure PPLR-33.

Orbiter Processing Facilities (OPF's) (KSC)

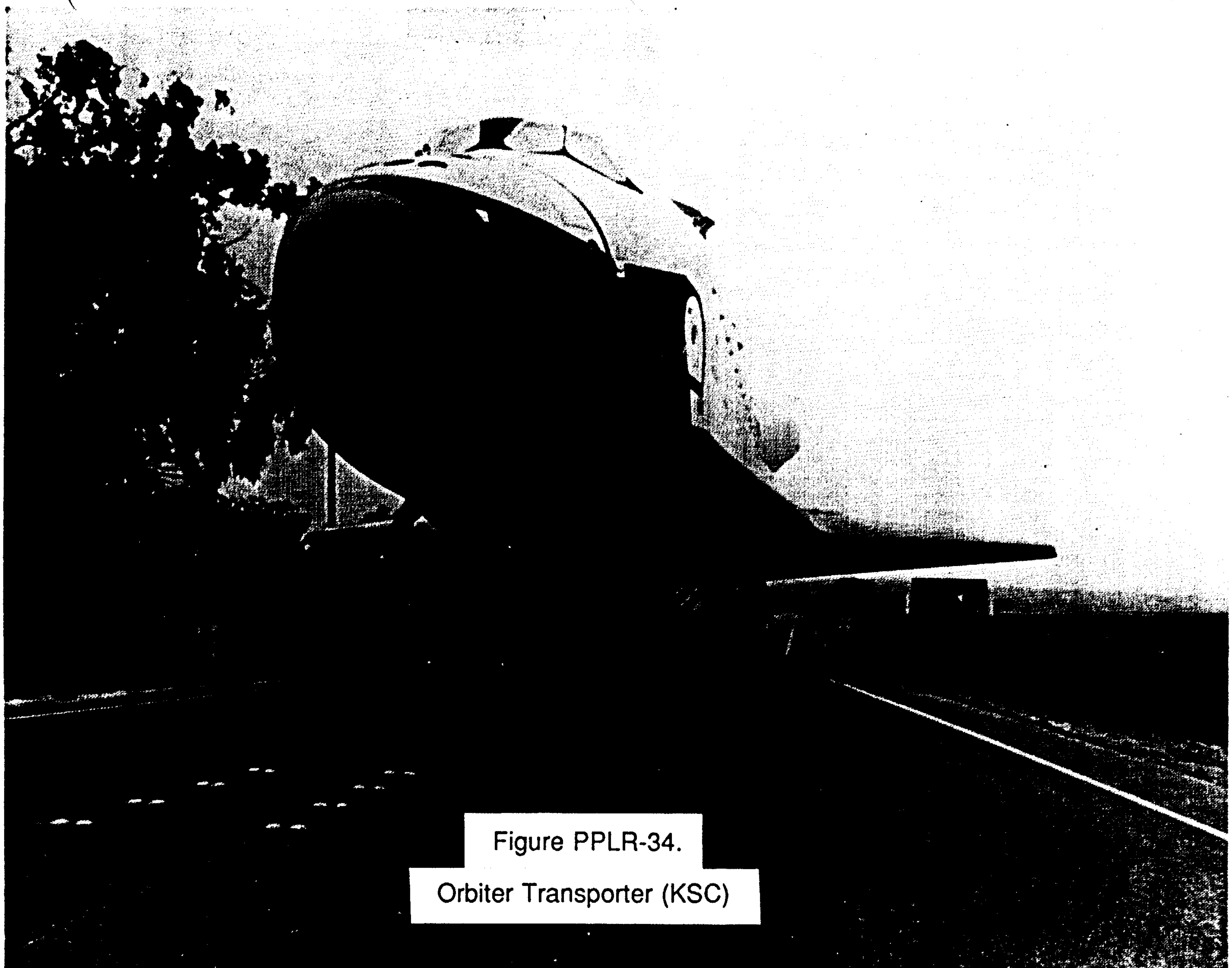


Figure PPLR-34.
Orbiter Transporter (KSC)

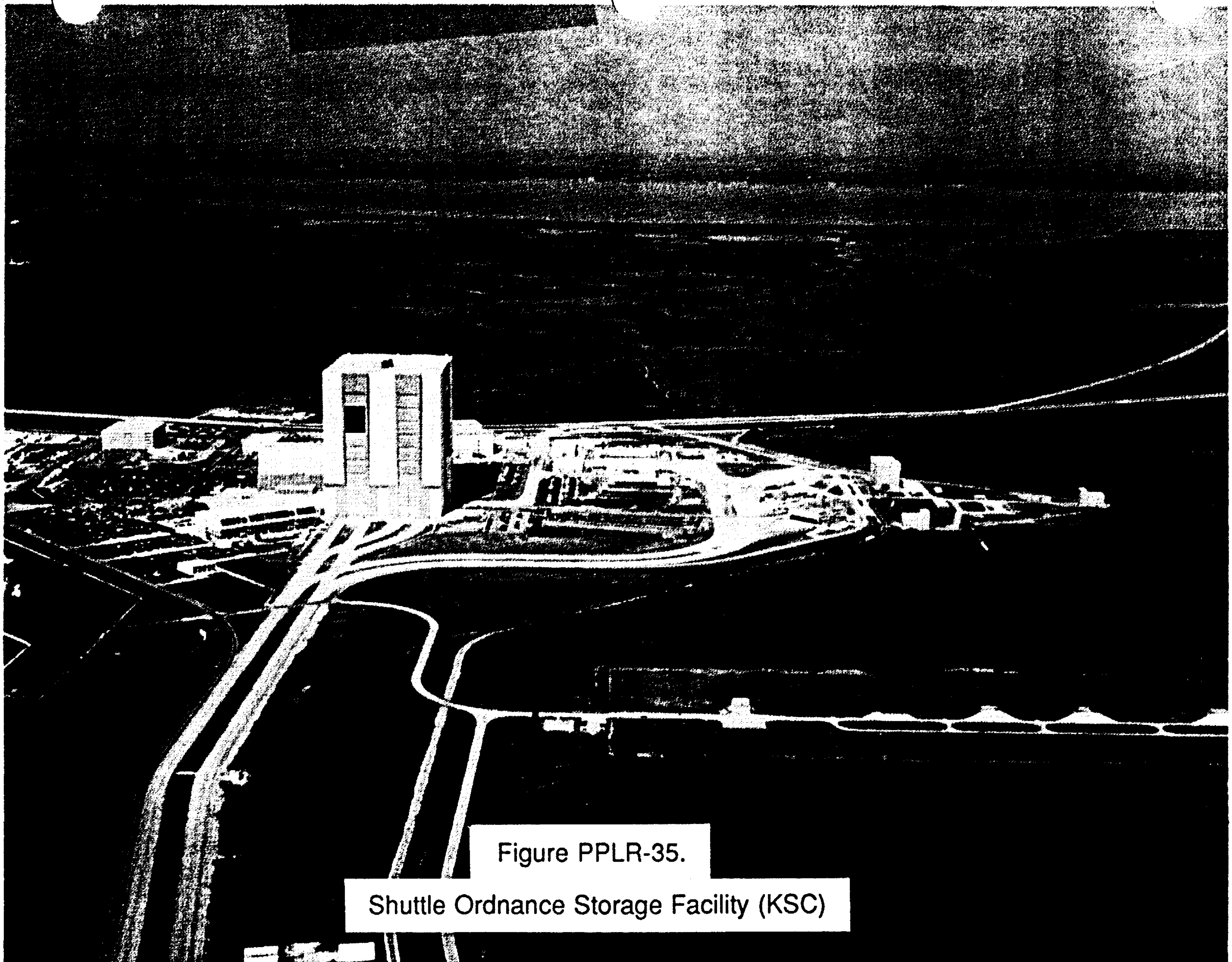


Figure PPLR-35.

Shuttle Ordnance Storage Facility (KSC)

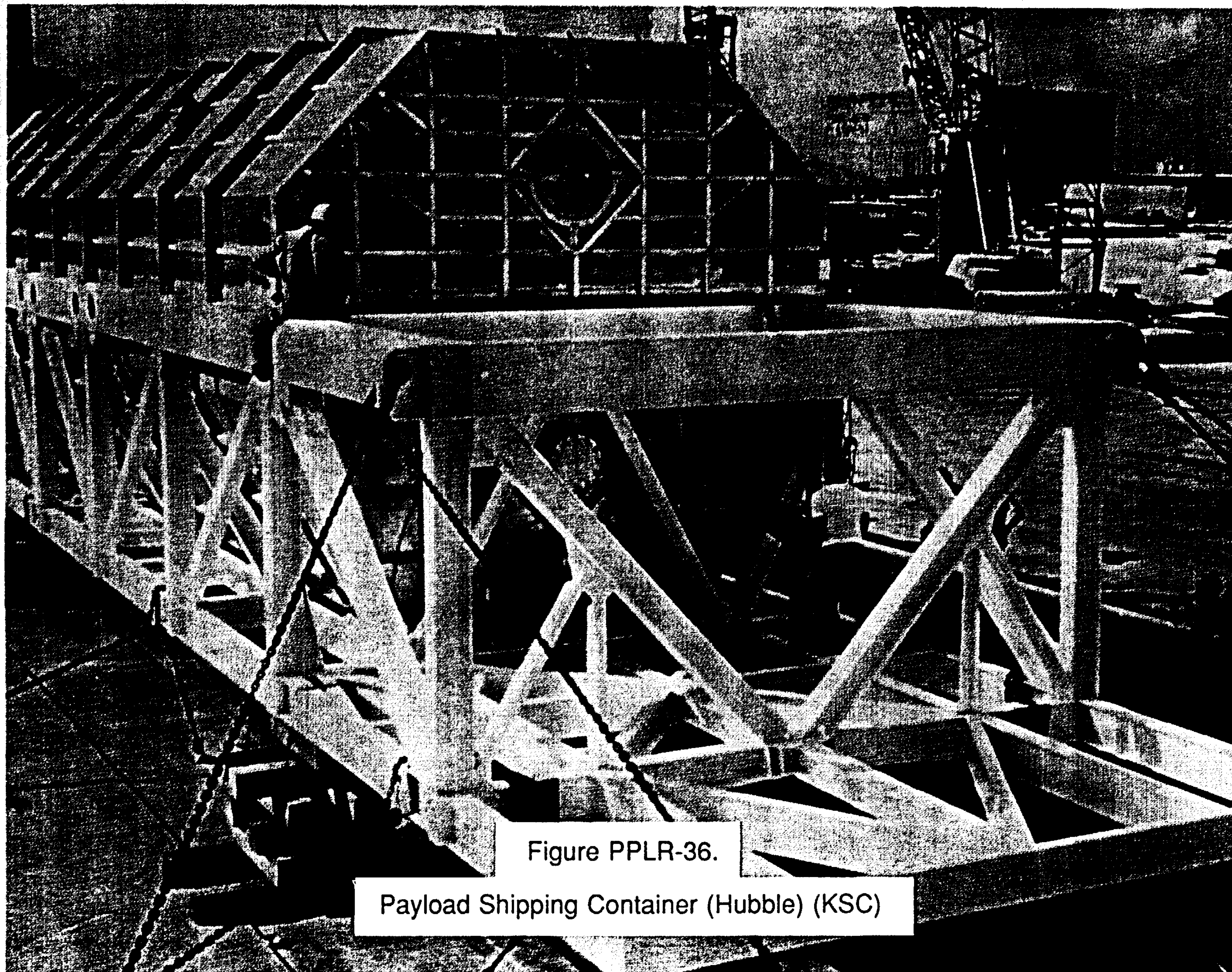


Figure PPLR-36.

Payload Shipping Container (Hubble) (KSC)

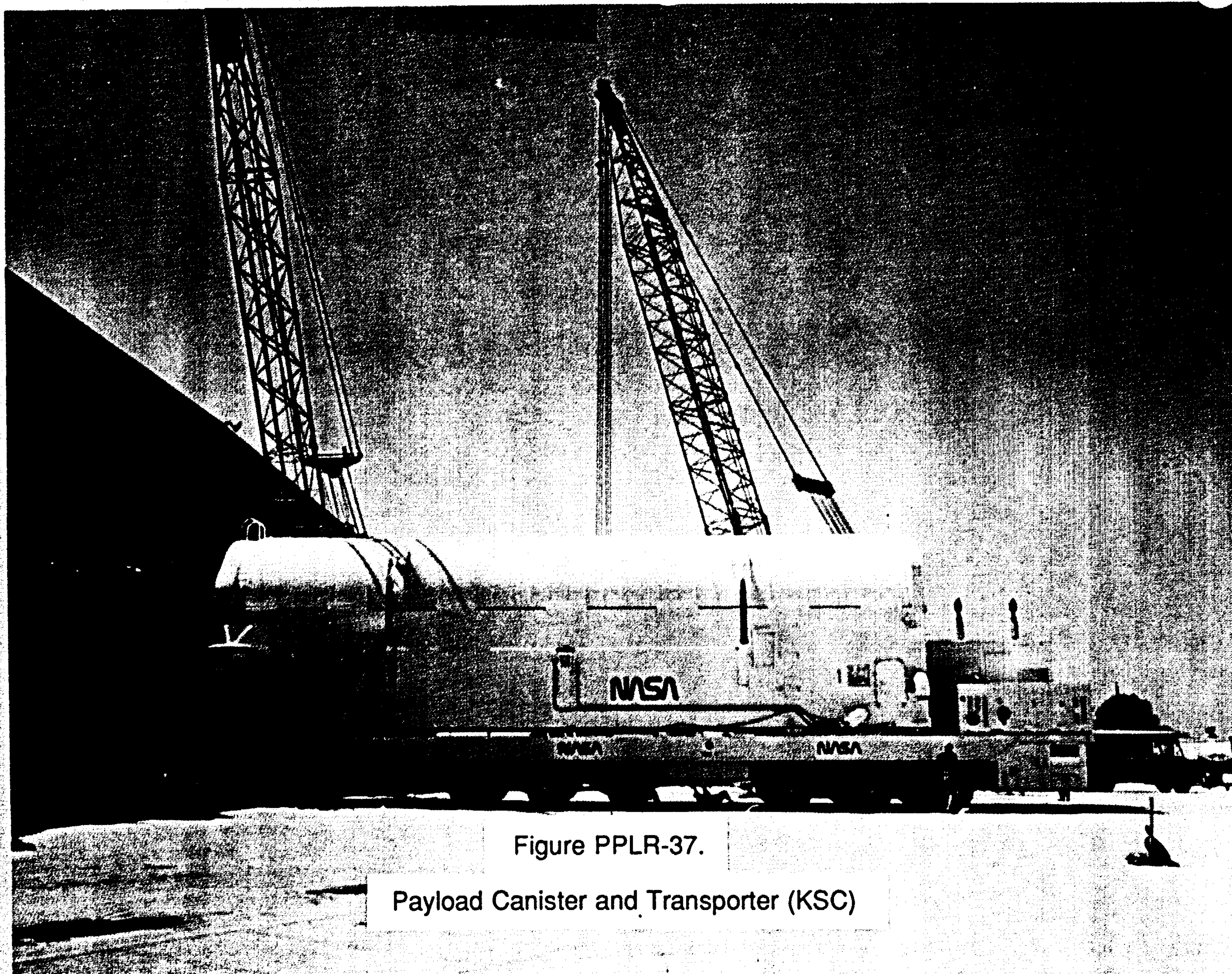


Figure PPLR-37.

Payload Canister and Transporter (KSC)

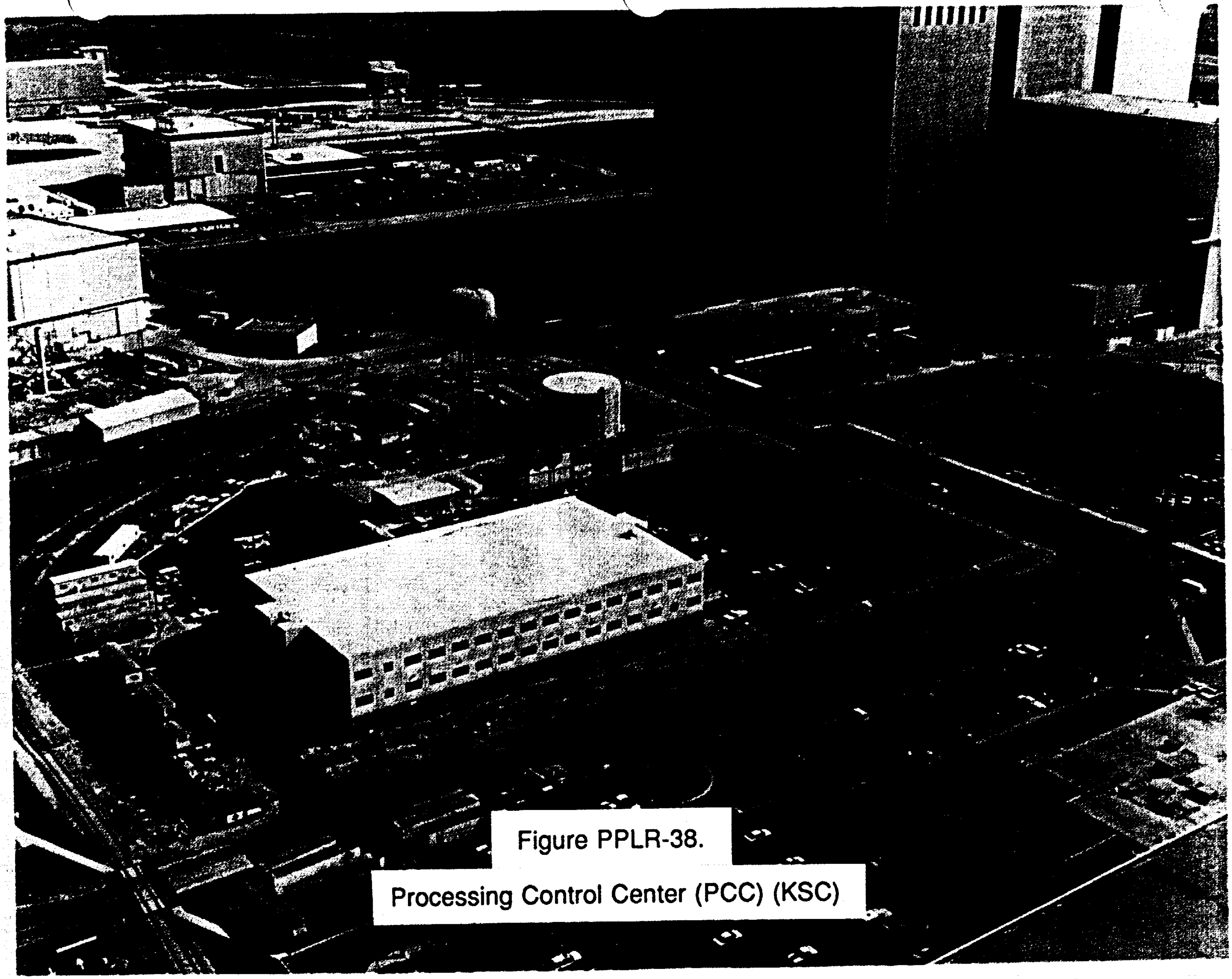
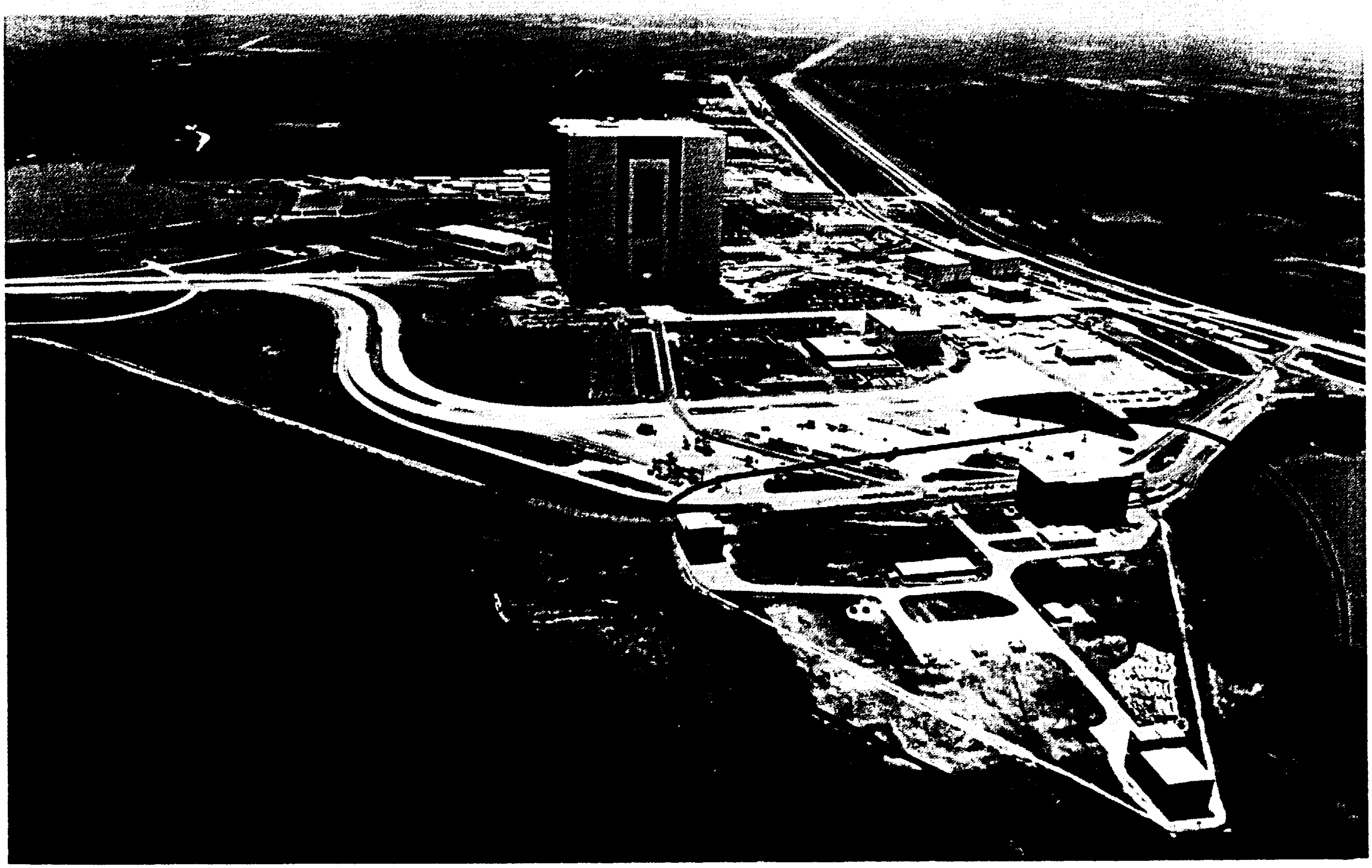


Figure PPLR-38.
Processing Control Center (PCC) (KSC)

Figure PPLR-39.

Solid Rocket Booster Processing and Segment Storage Facility (KSC)



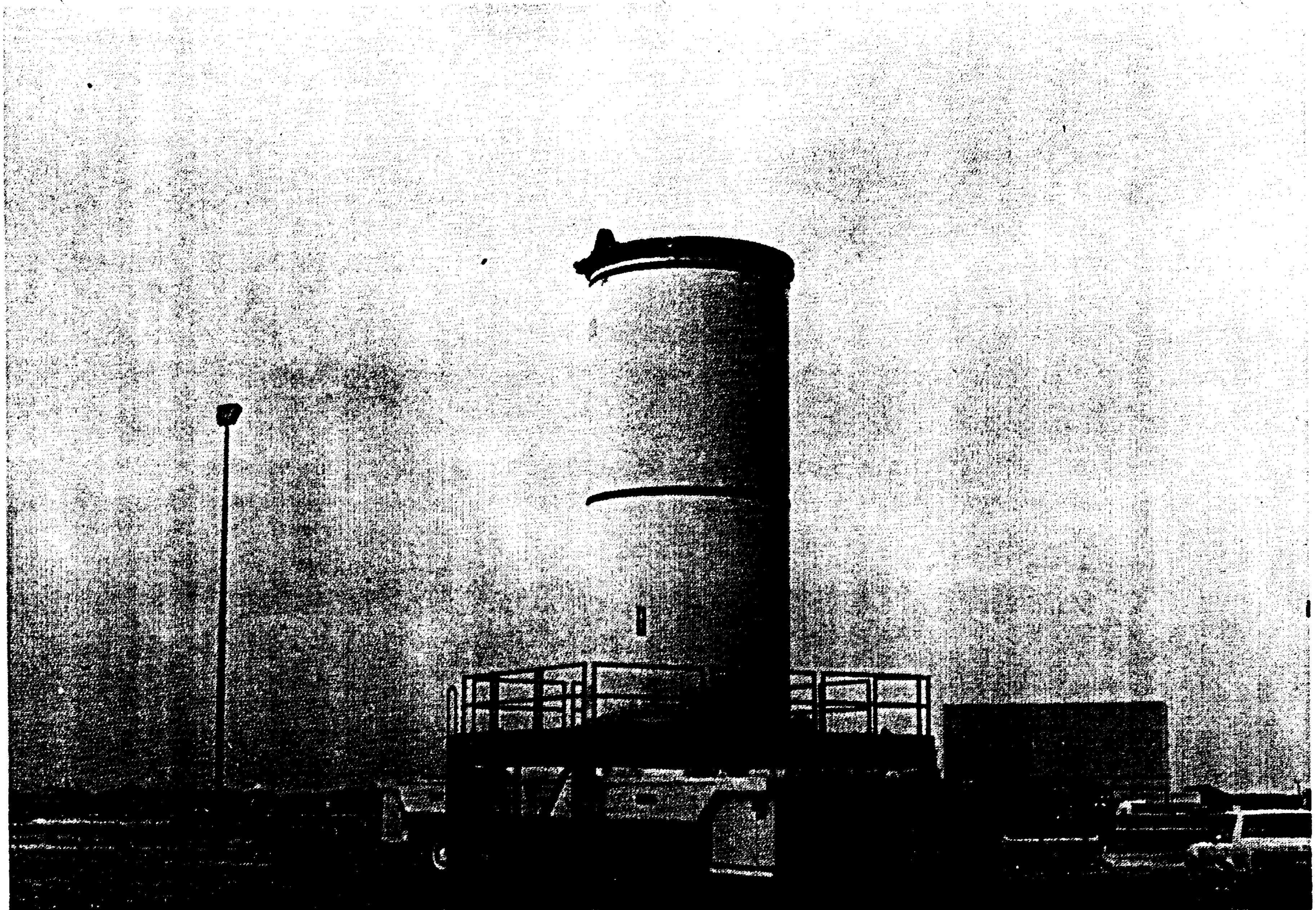


Figure PPLR-40. SRM Transporter (KSC)

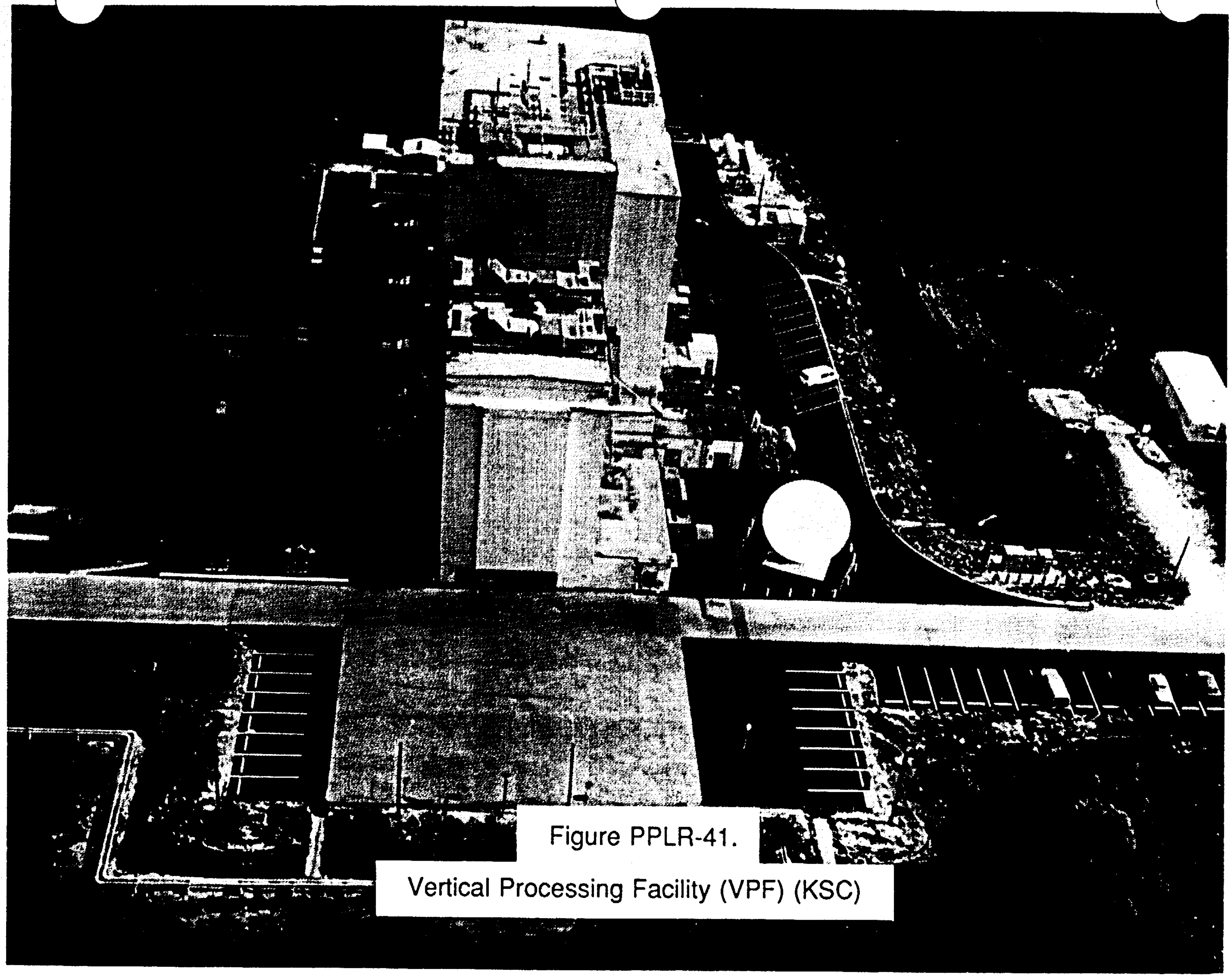


Figure PPLR-41.

Vertical Processing Facility (VPF) (KSC)

Figure PPLR-42.

Thermal Protection System Facility (KSC)

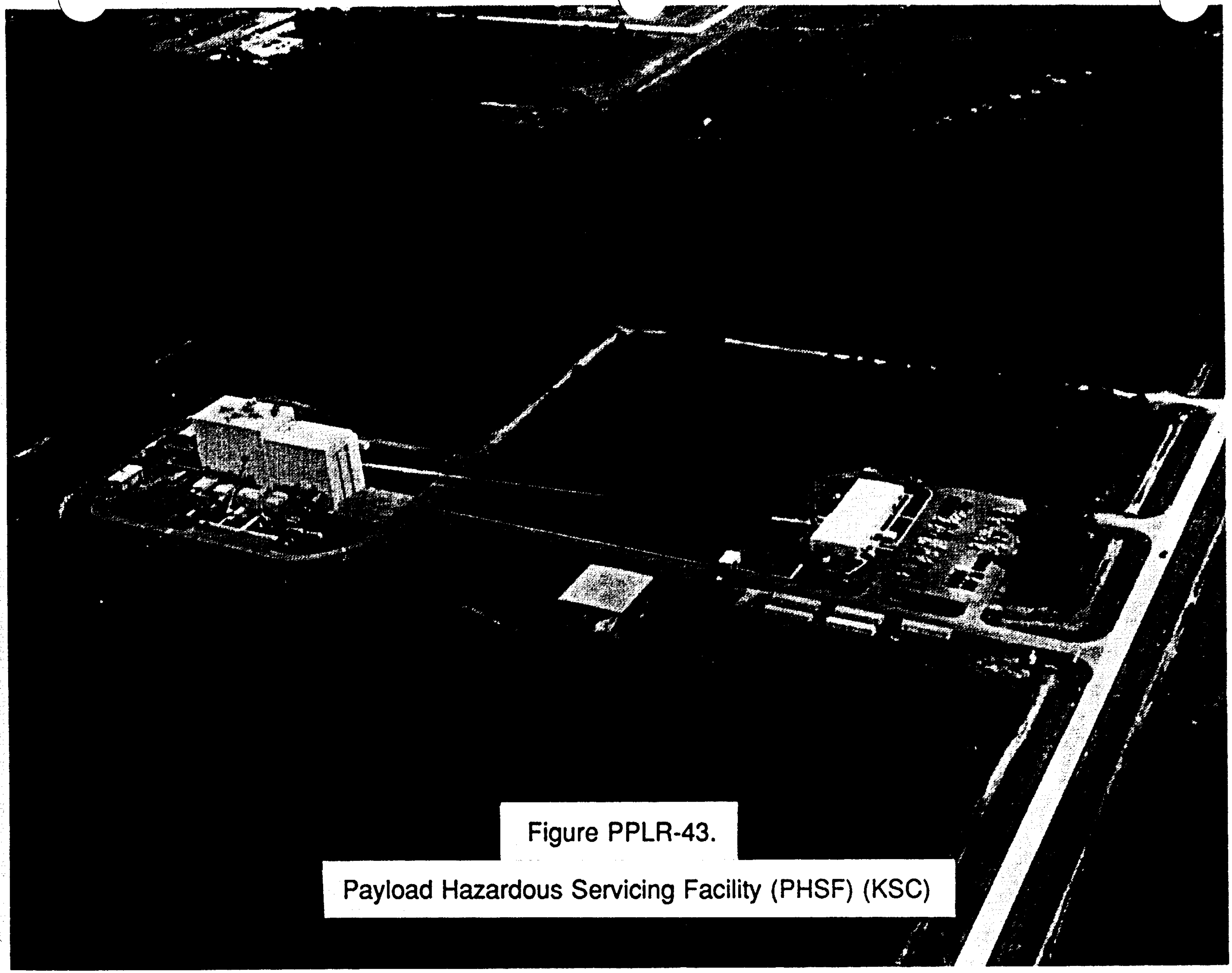


Figure PPLR-43.

Payload Hazardous Servicing Facility (PHSF) (KSC)

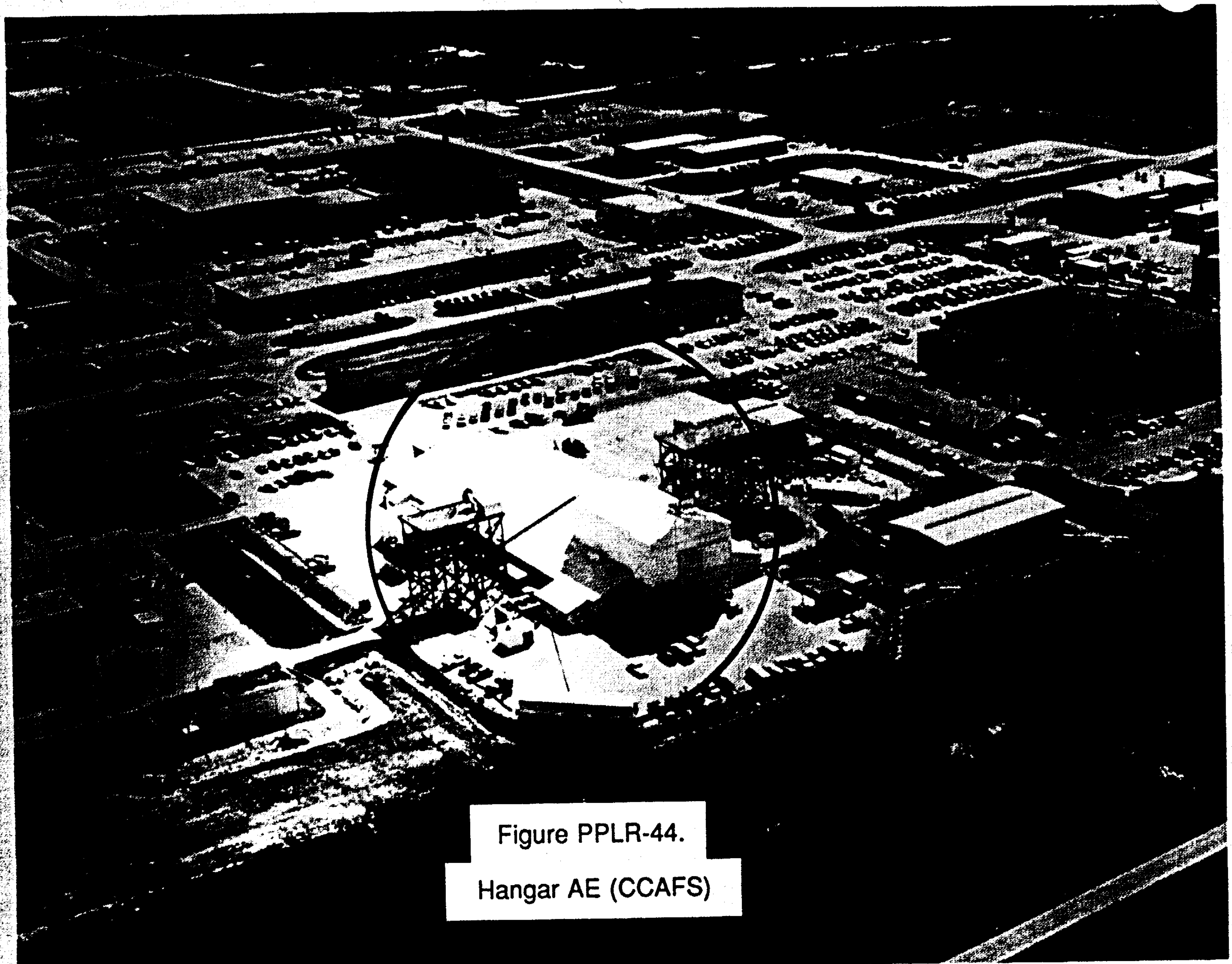


Figure PPLR-44.
Hangar AE (CCAFS)

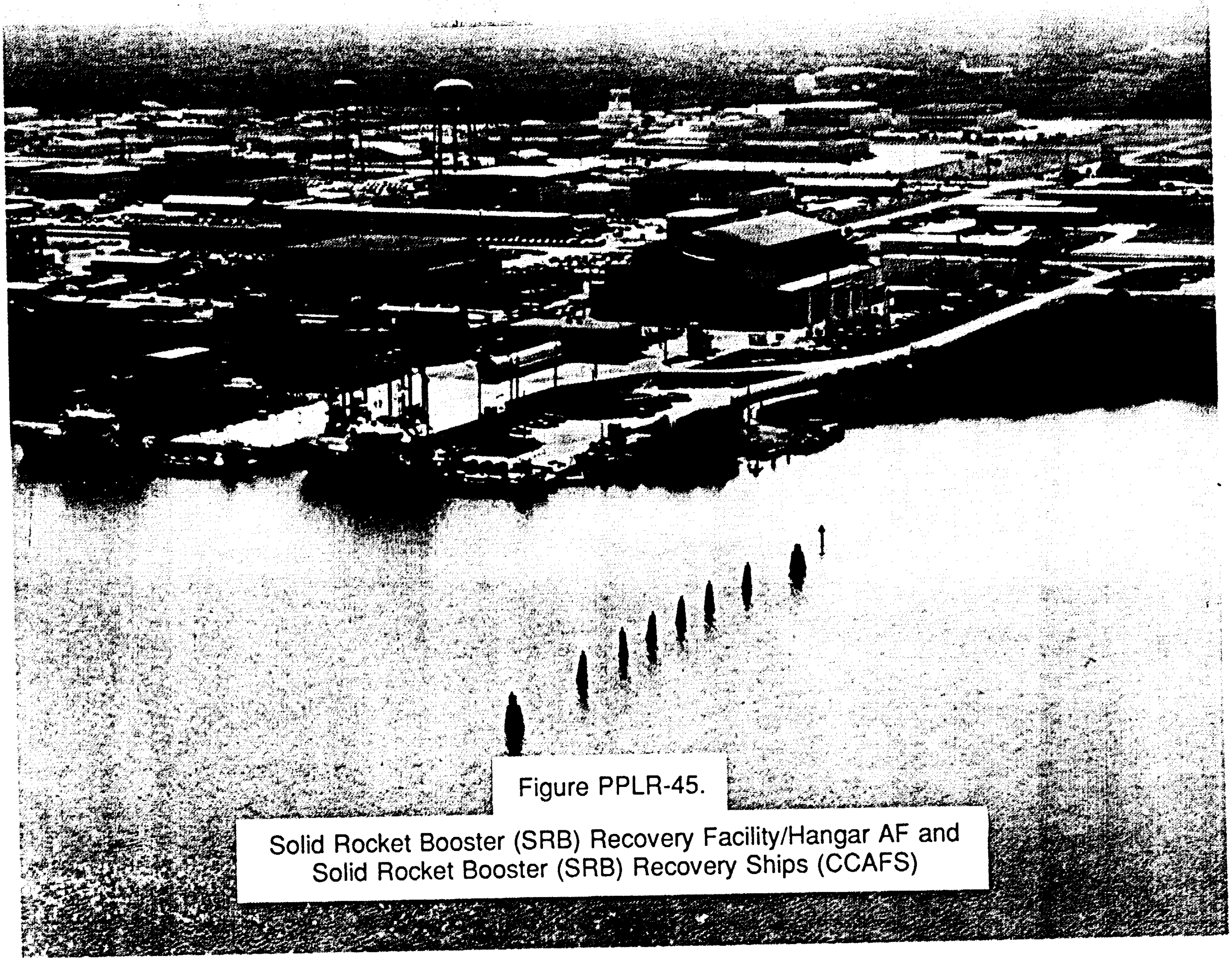


Figure PPLR-45.

Solid Rocket Booster (SRB) Recovery Facility/Hangar AF and Solid Rocket Booster (SRB) Recovery Ships (CCAFS)

Figure PPLR-46. Hangar S (CCAFS)

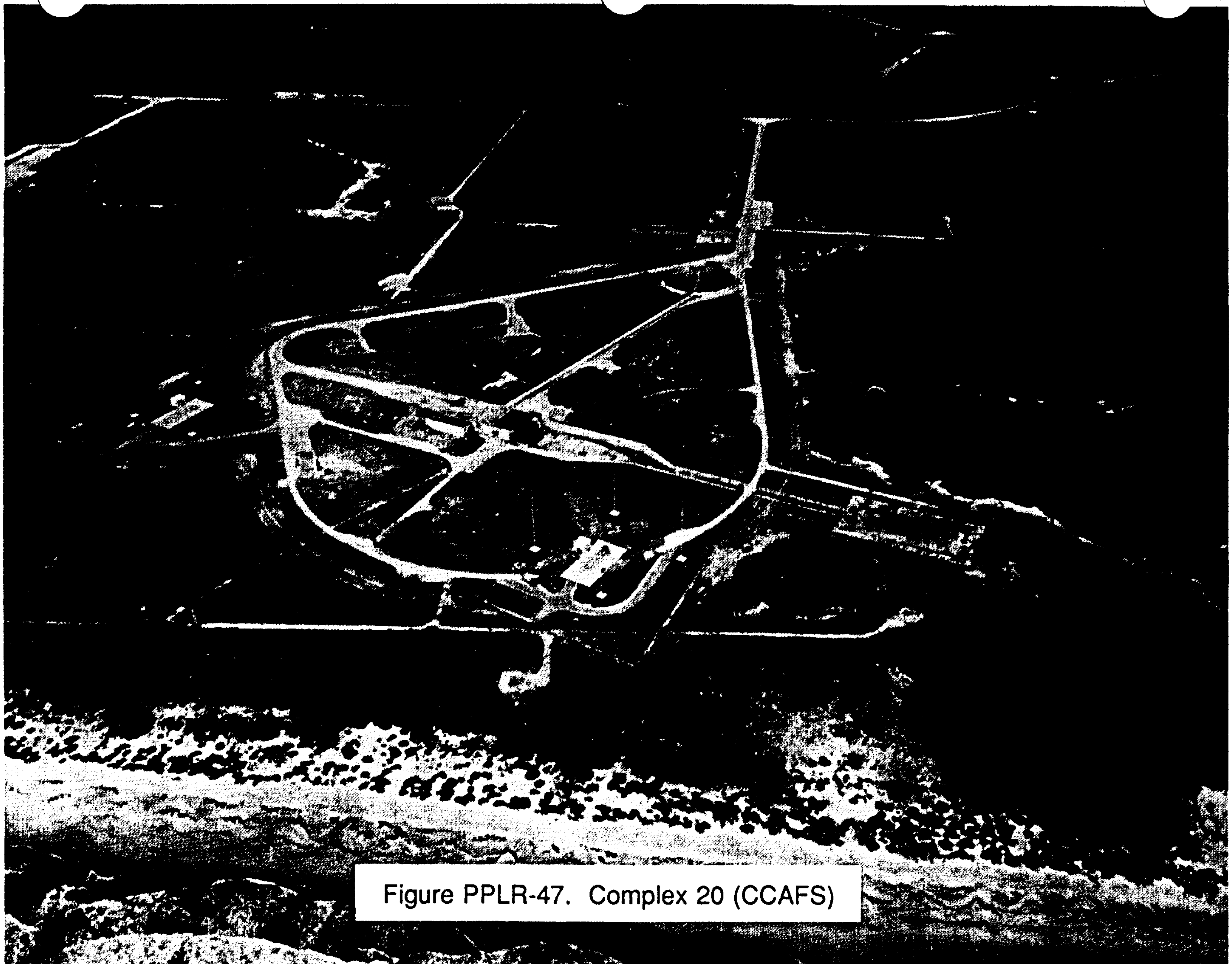


Figure PPLR-47. Complex 20 (CCAFS)

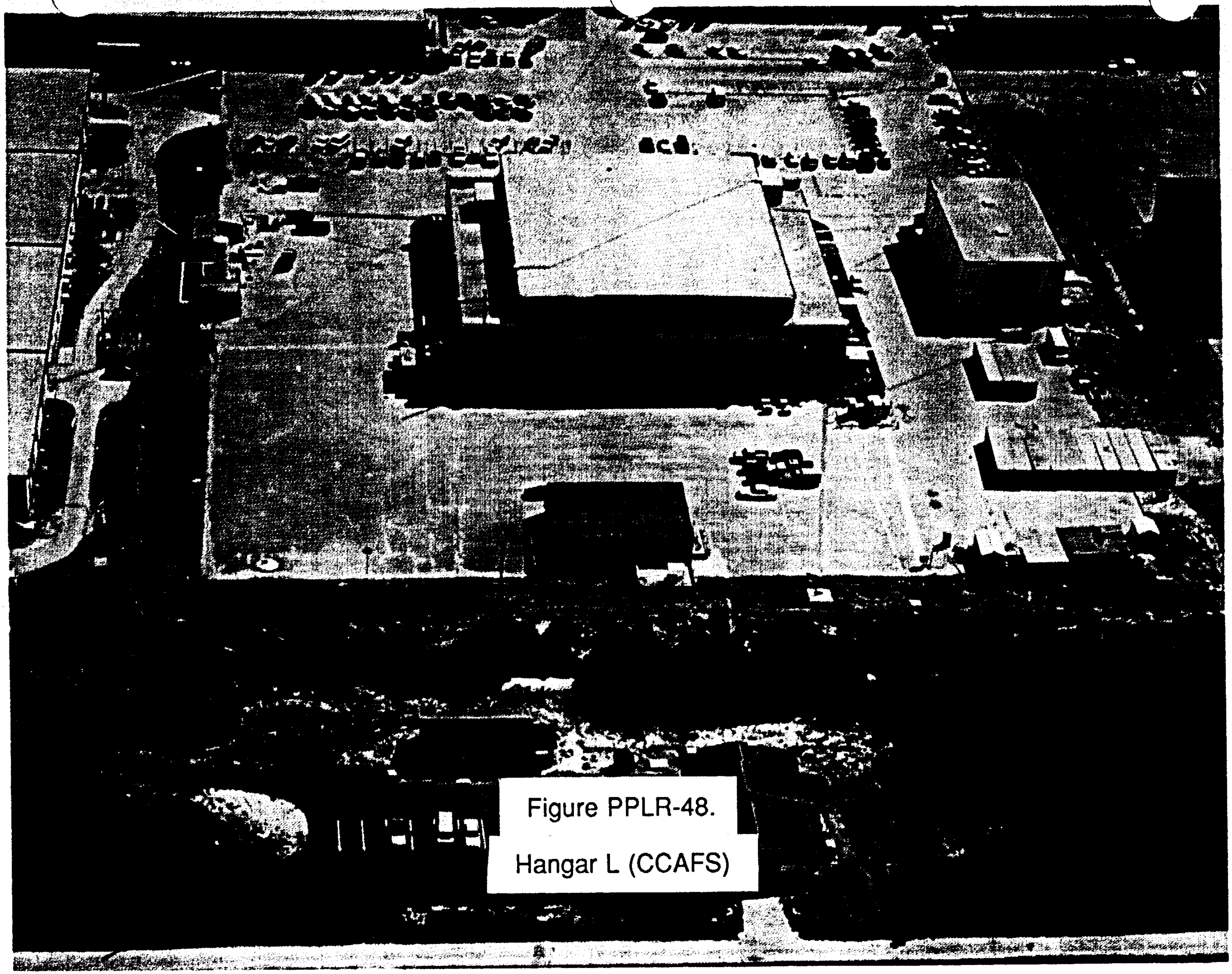


Figure PPLR-48.
Hangar L (CCAFS)

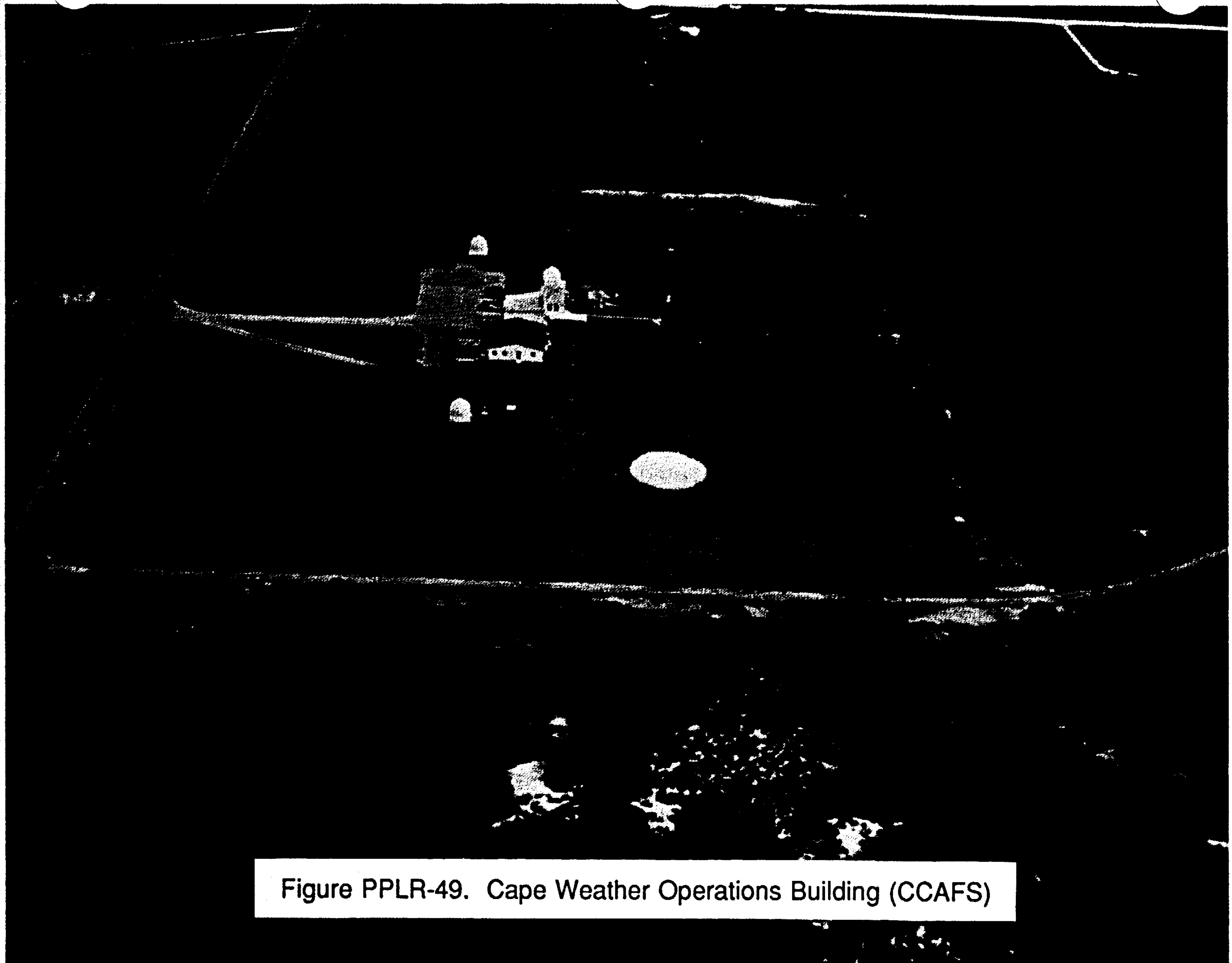


Figure PPLR-49. Cape Weather Operations Building (CCAFS)

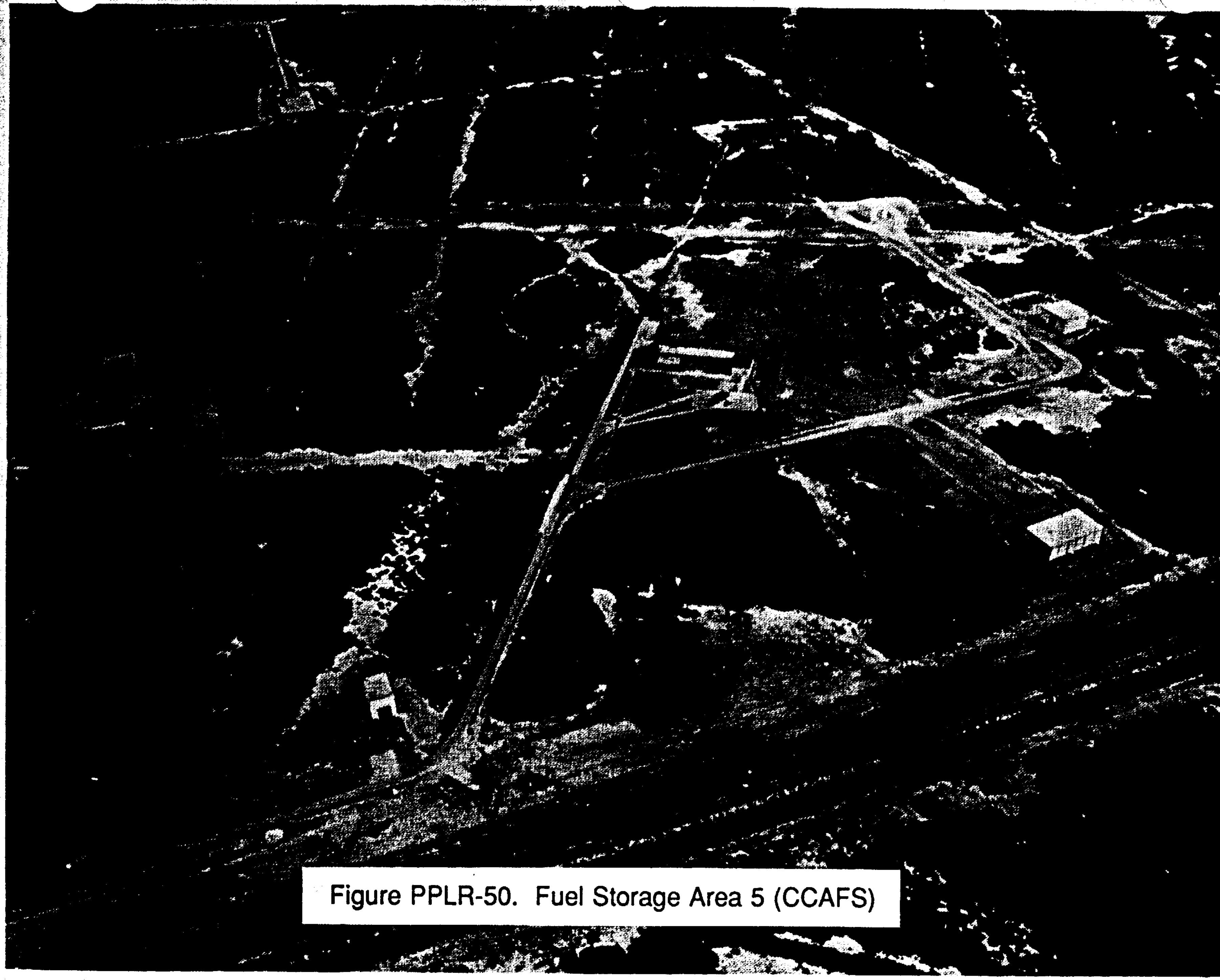


Figure PPLR-50. Fuel Storage Area 5 (CCAFS)

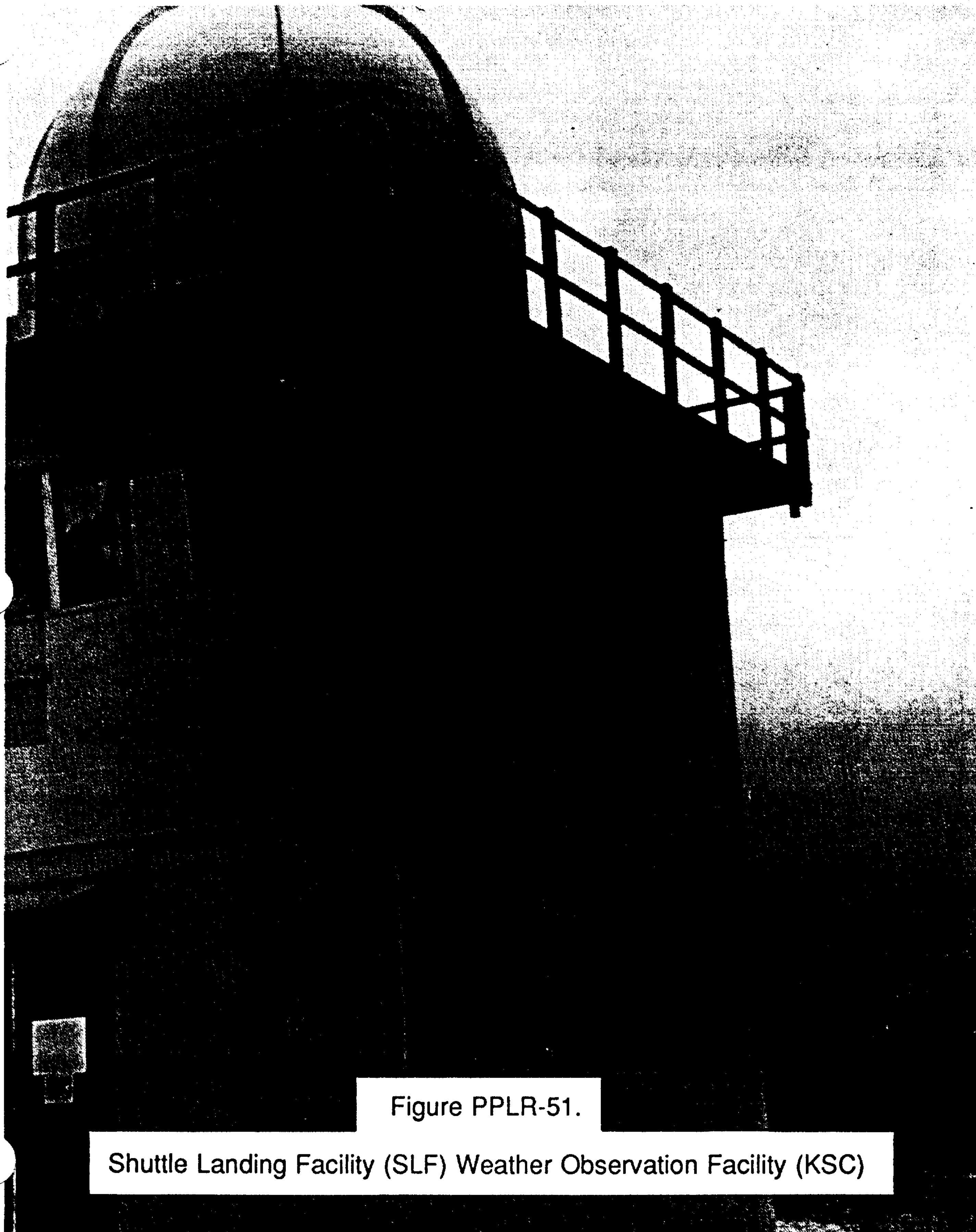


Figure PPLR-51.

Shuttle Landing Facility (SLF) Weather Observation Facility (KSC)

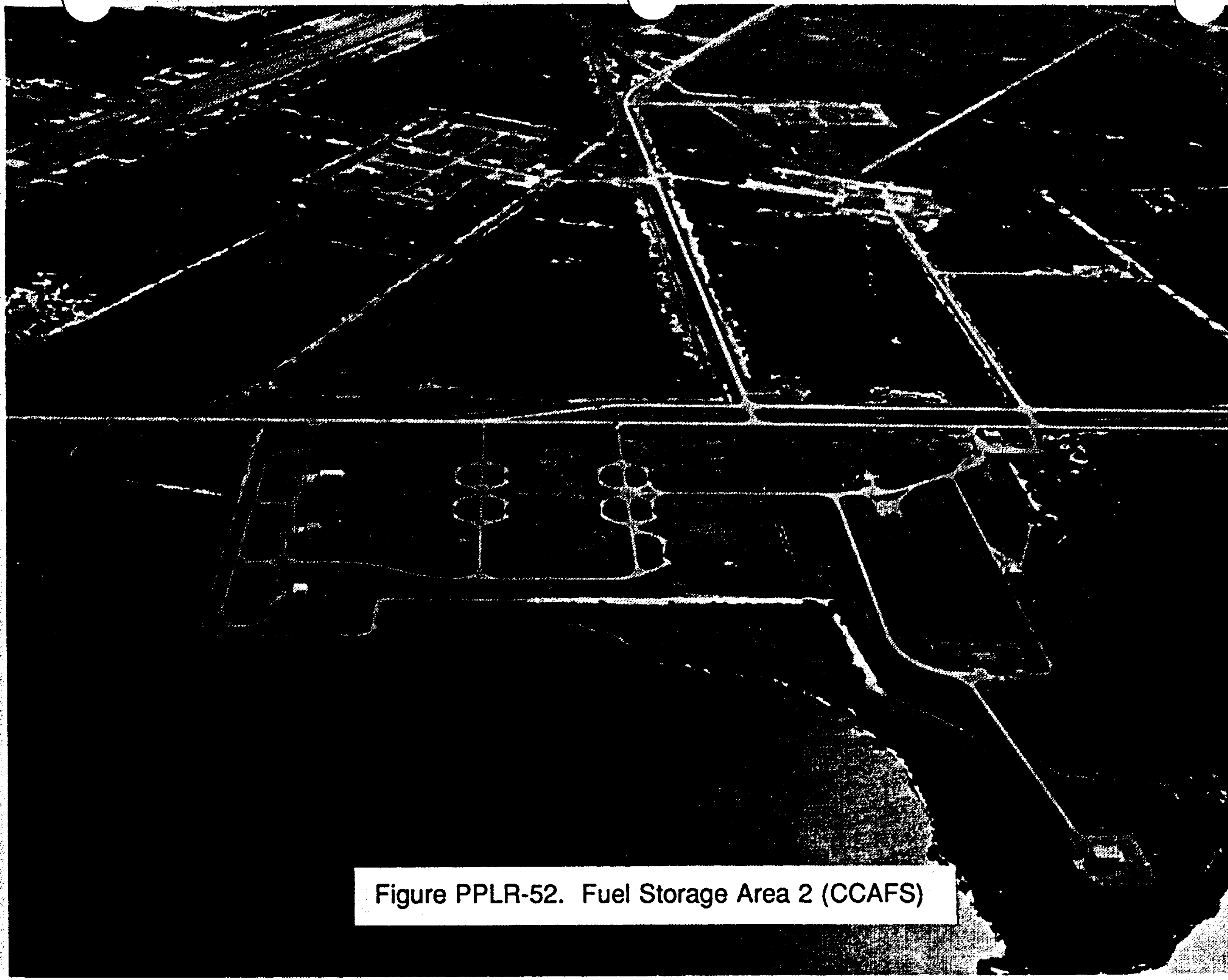


Figure PPLR-52. Fuel Storage Area 2 (CCAFS)

Figure PPLR-53.

Jonathan Dickinson Missile Tracking Annex (JDMTA)
(Stuart, FL)

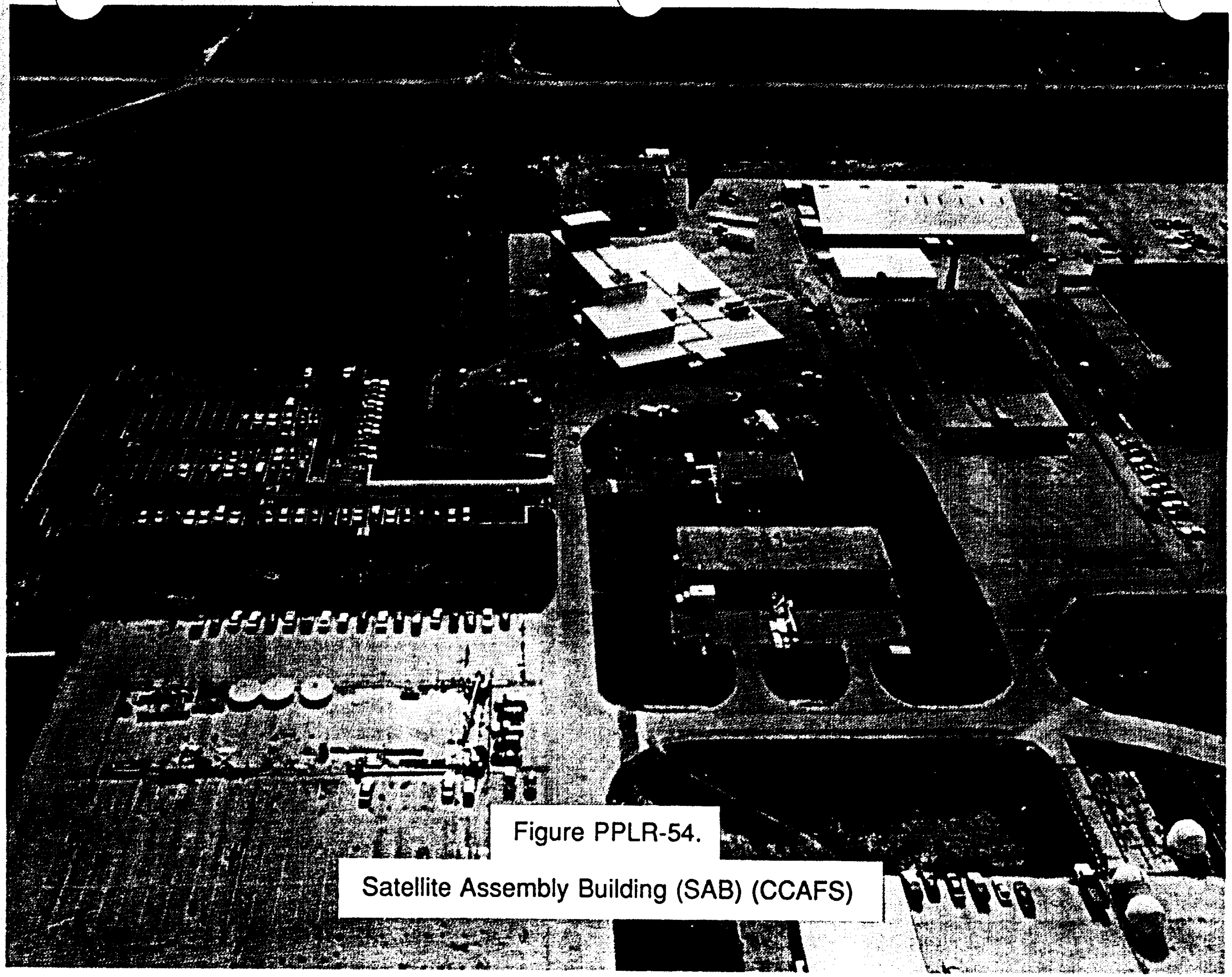


Figure PPLR-54.
Satellite Assembly Building (SAB) (CCAFS)

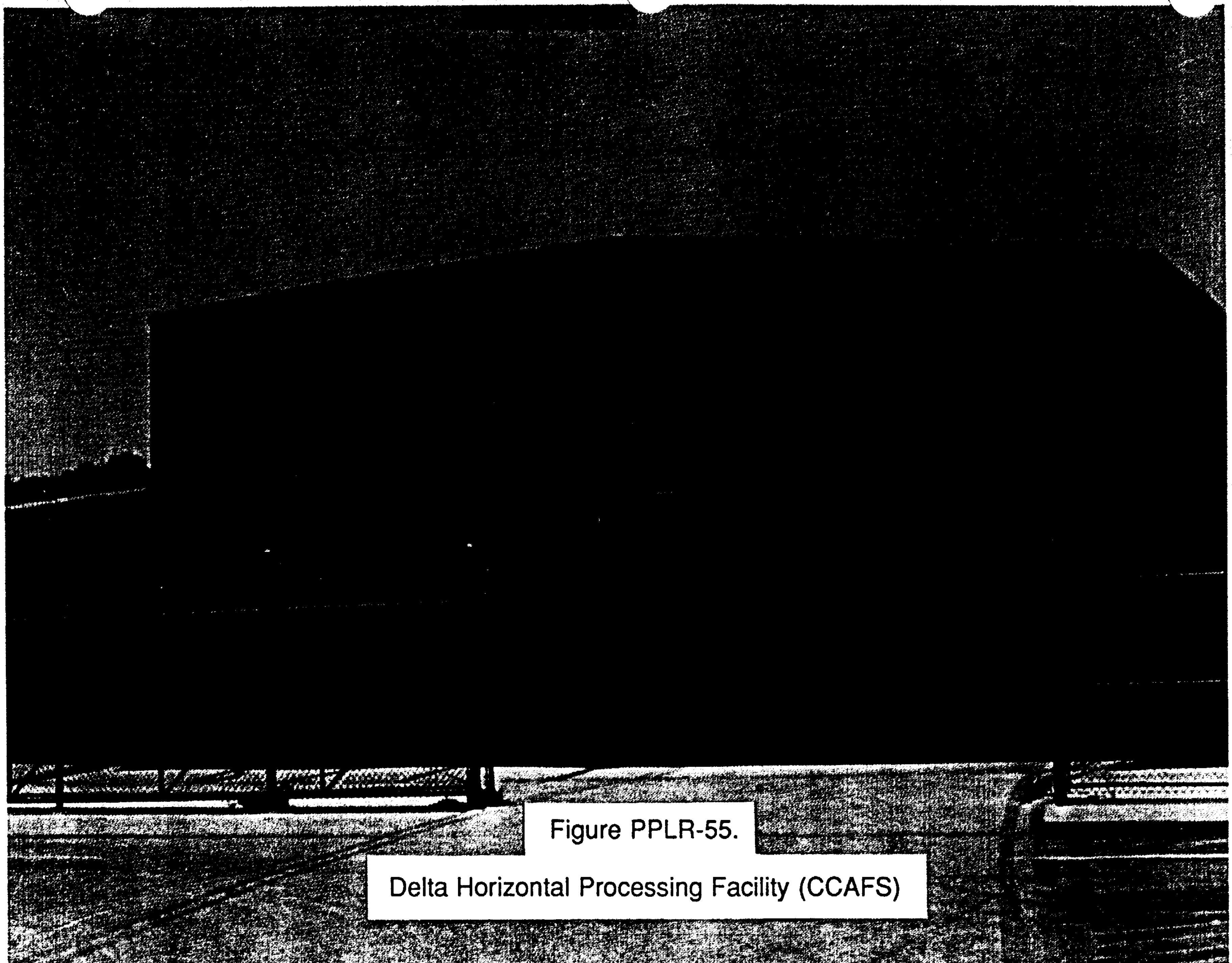


Figure PPLR-55.

Delta Horizontal Processing Facility (CCAFS)

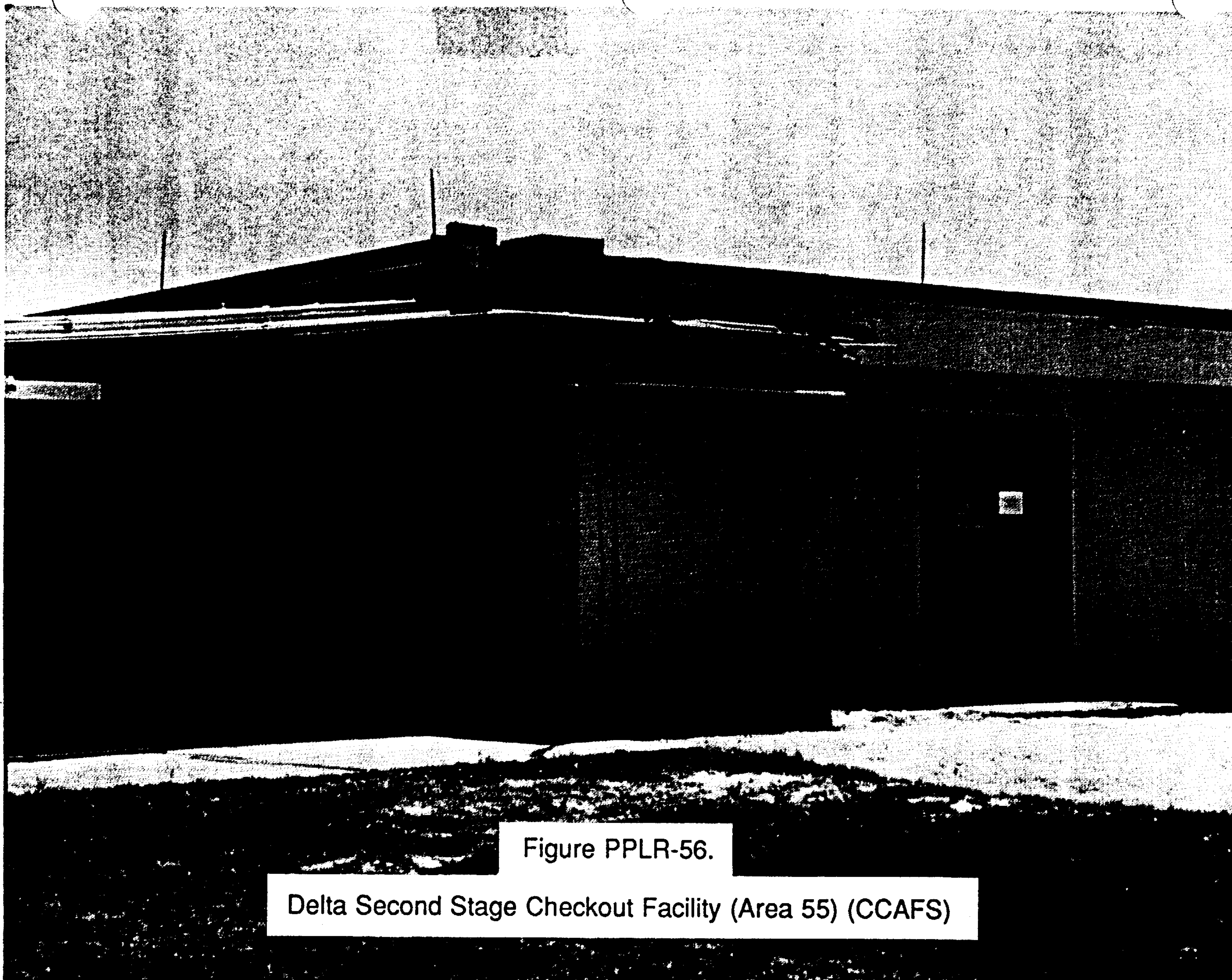


Figure PPLR-56.

Delta Second Stage Checkout Facility (Area 55) (CCAFS)

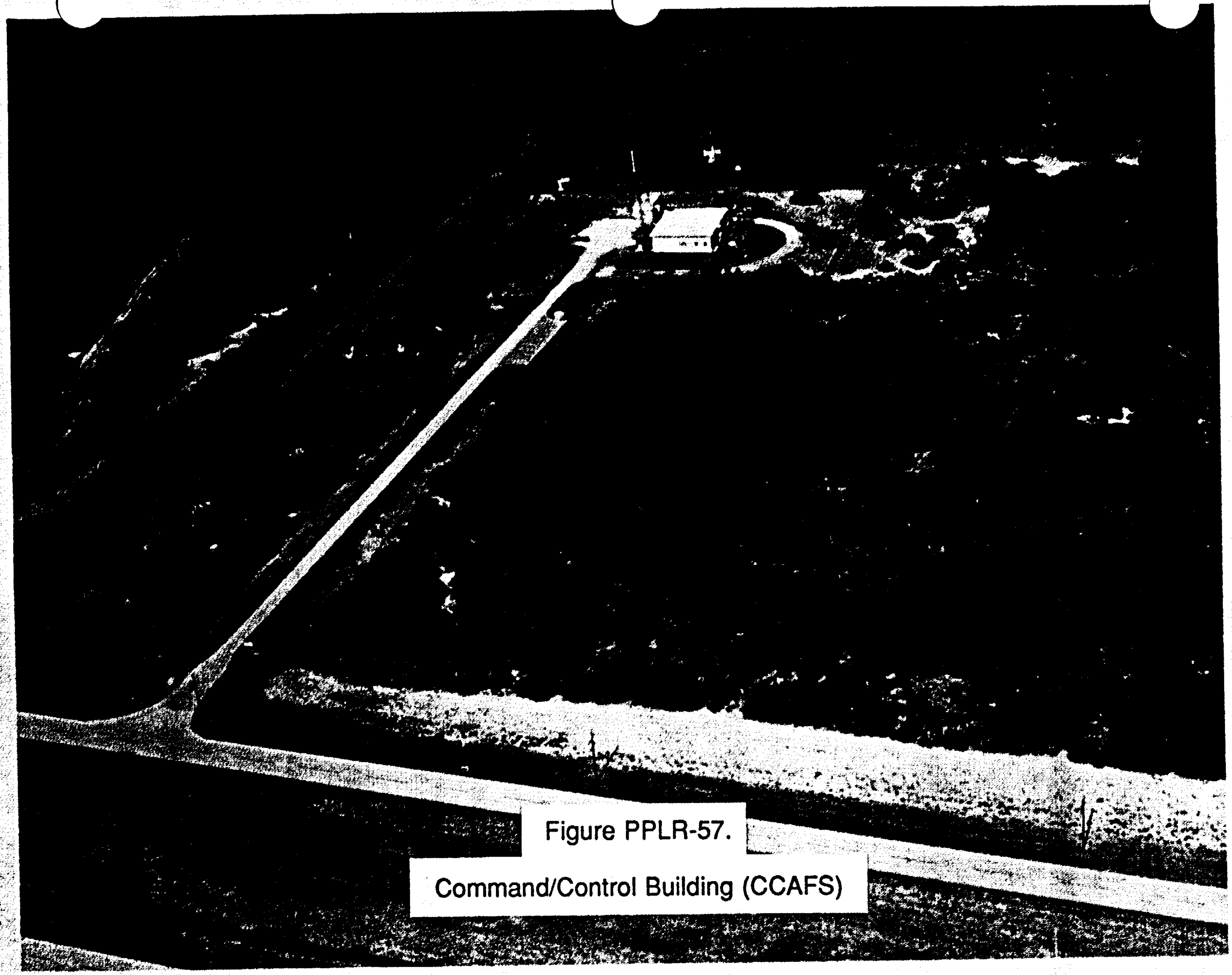


Figure PPLR-57.

Command/Control Building (CCAFS)

Figure PPLR-58.

Delta Flight Hardware Storage Facility (CCAFS)

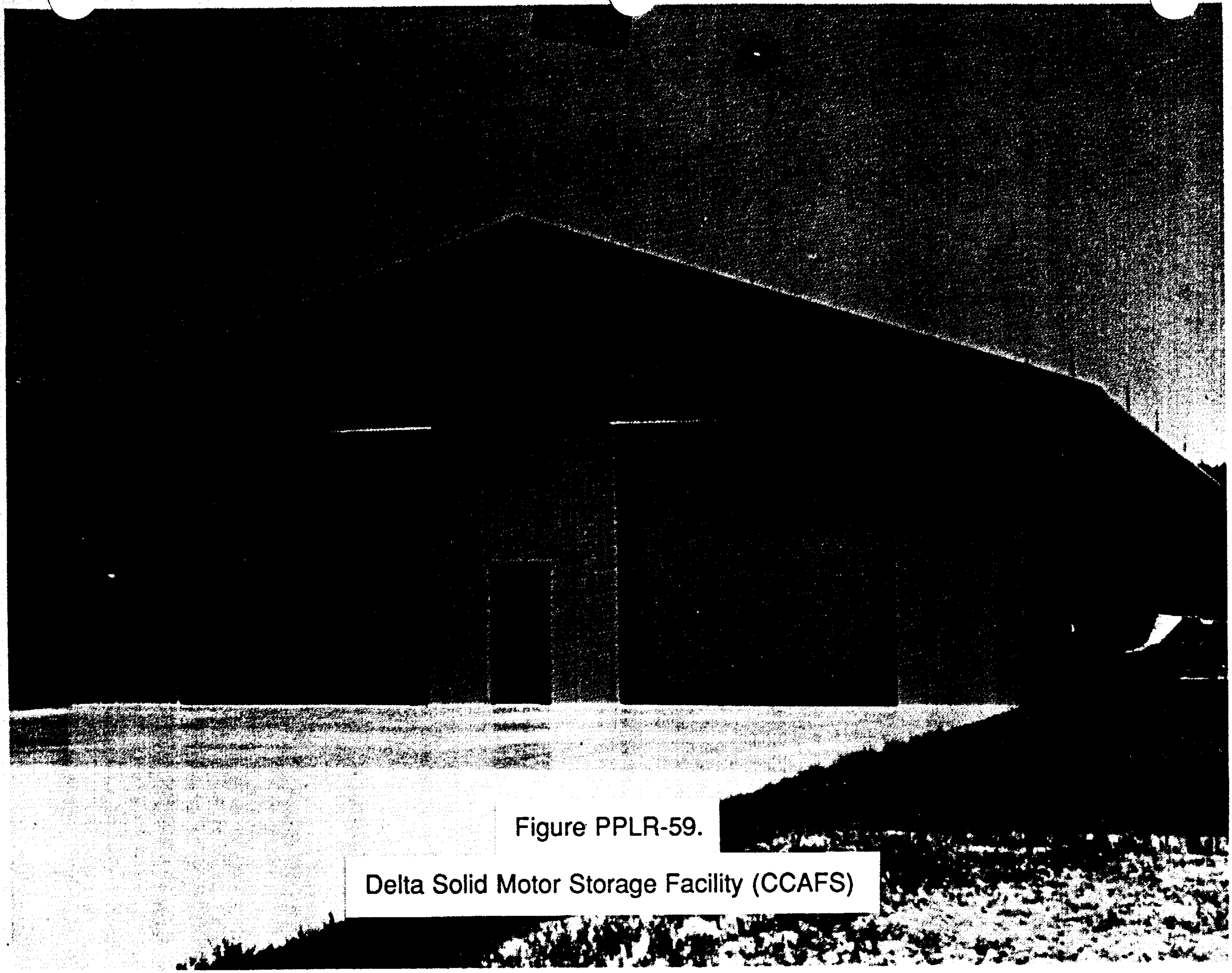
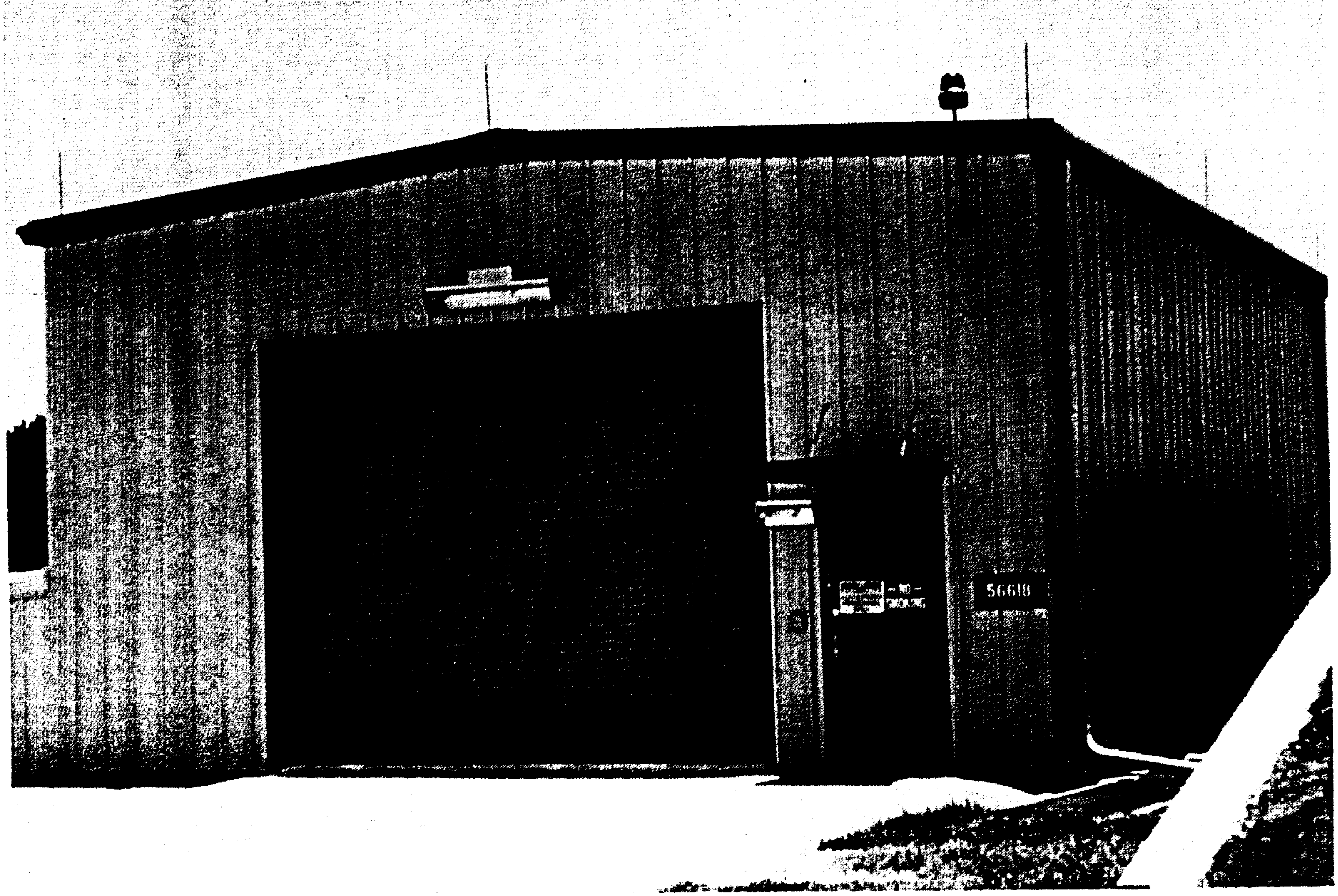


Figure PPLR-59.

Delta Solid Motor Storage Facility (CCAFS)

Figure PPLR-60.

Delta Second Stage High Pressure Test Facility (Area 55) (CCAFS)



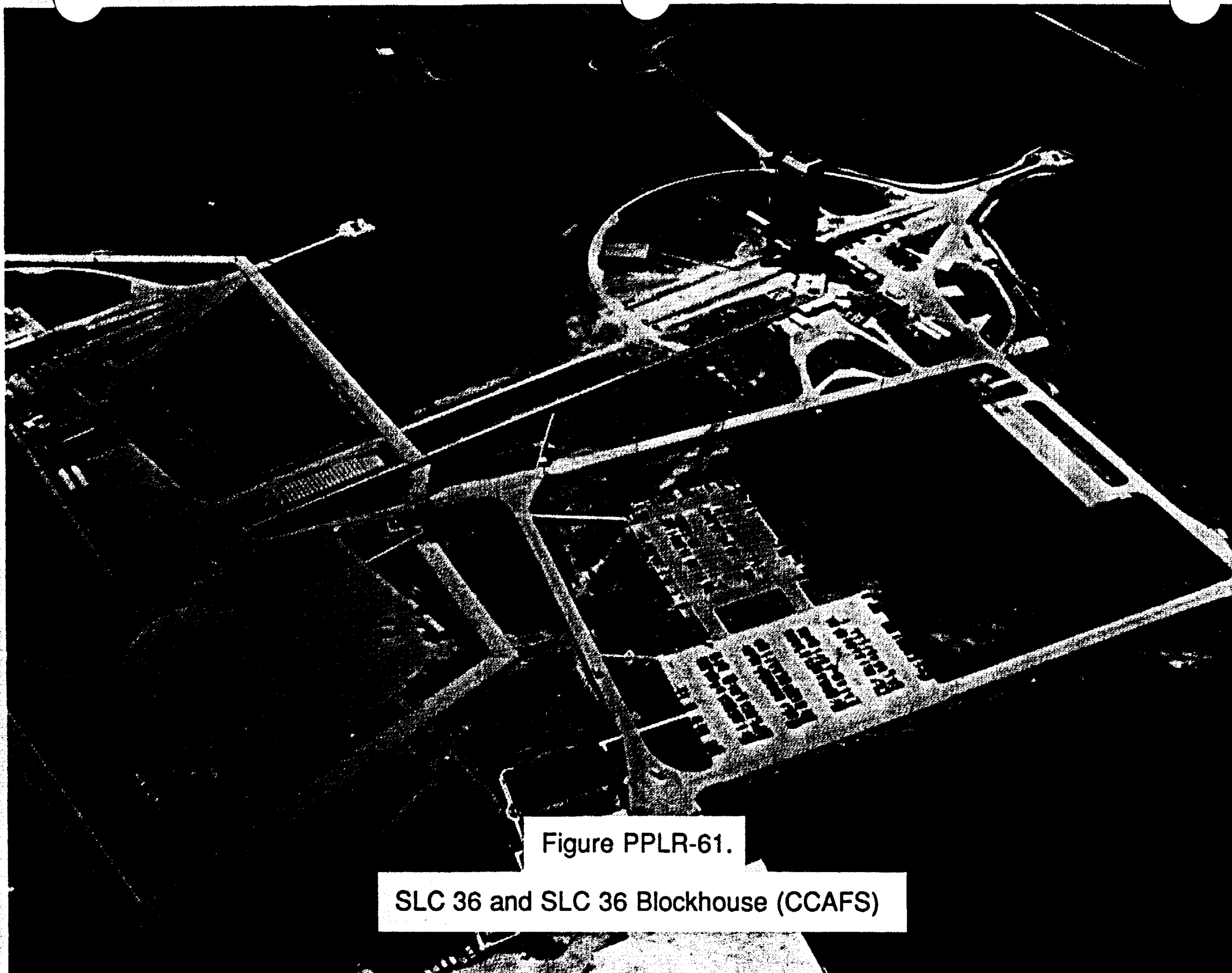


Figure PPLR-61.

SLC 36 and SLC 36 Blockhouse (CCAFS)

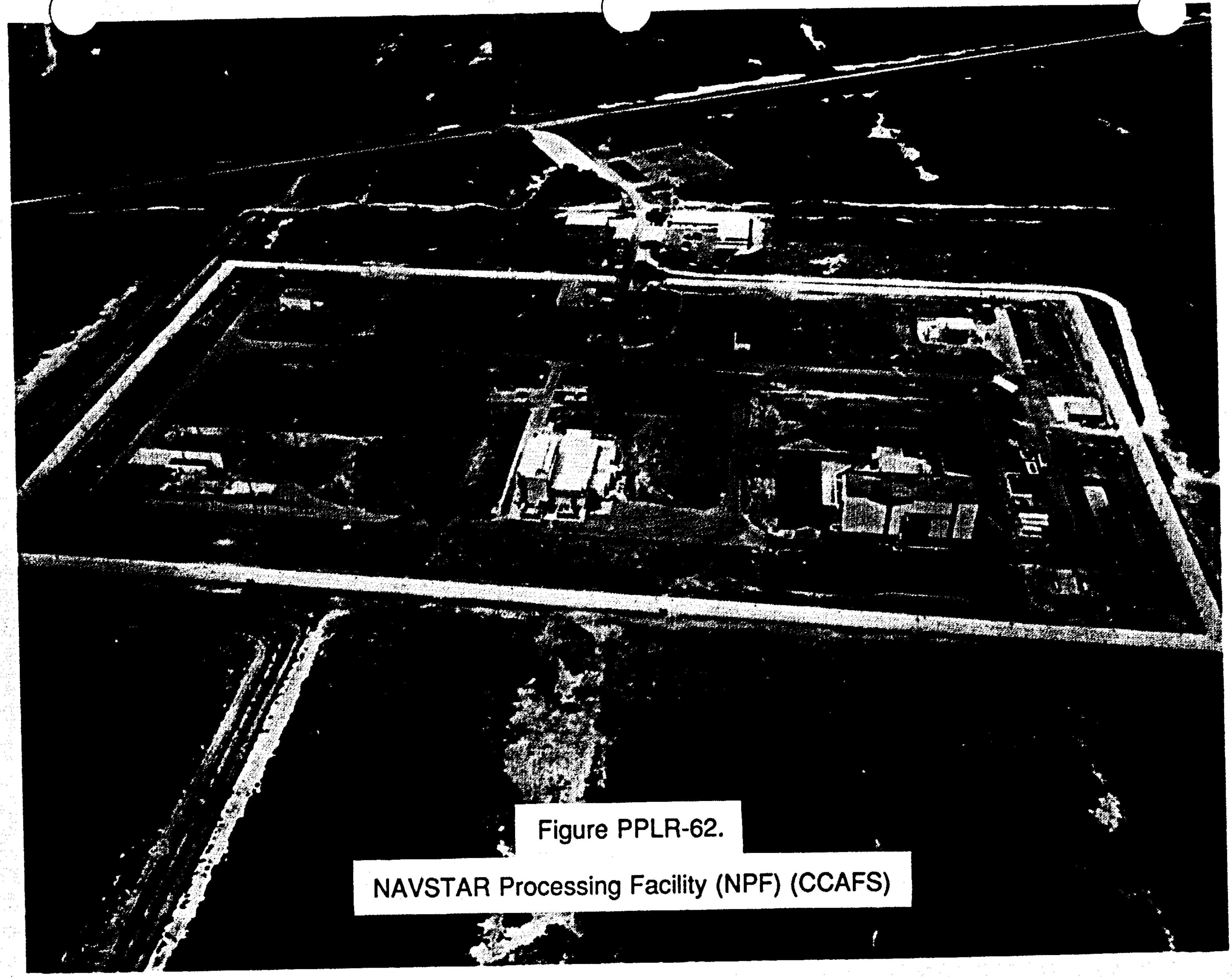


Figure PPLR-62.

NAVSTAR Processing Facility (NPF) (CCAFS)

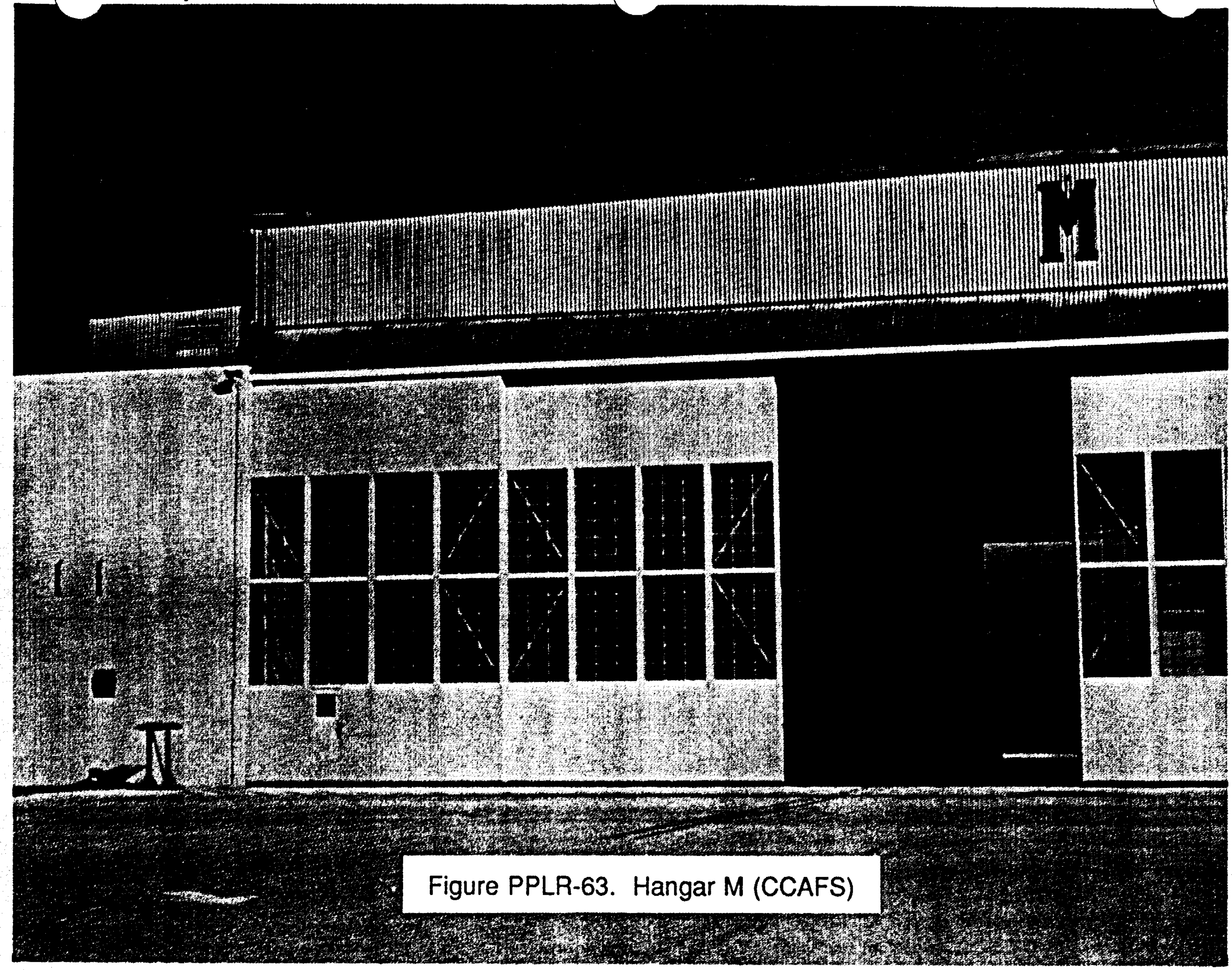


Figure PPLR-63. Hangar M (CCAFS)

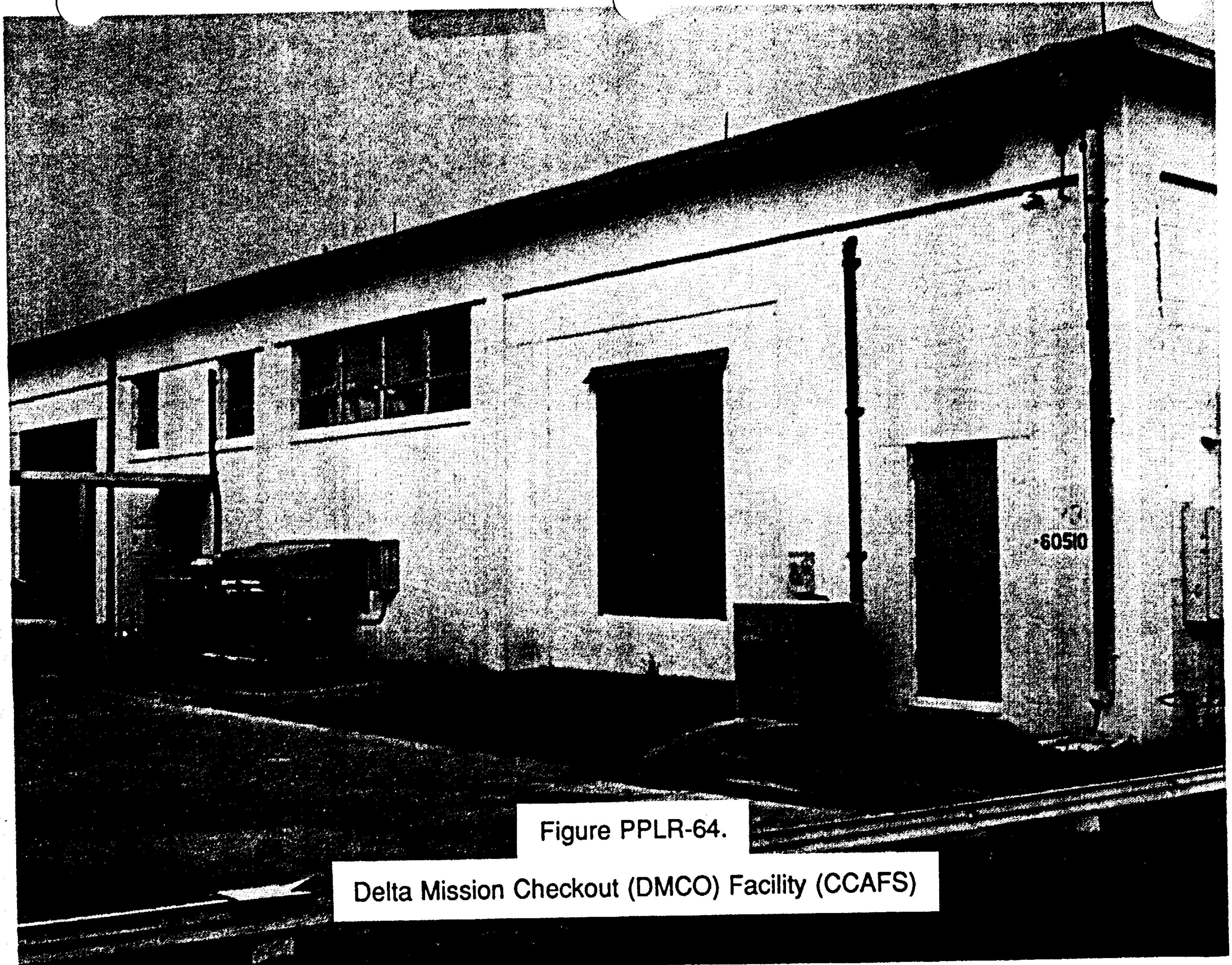


Figure PPLR-64.

Delta Mission Checkout (DMCO) Facility (CCAFS)

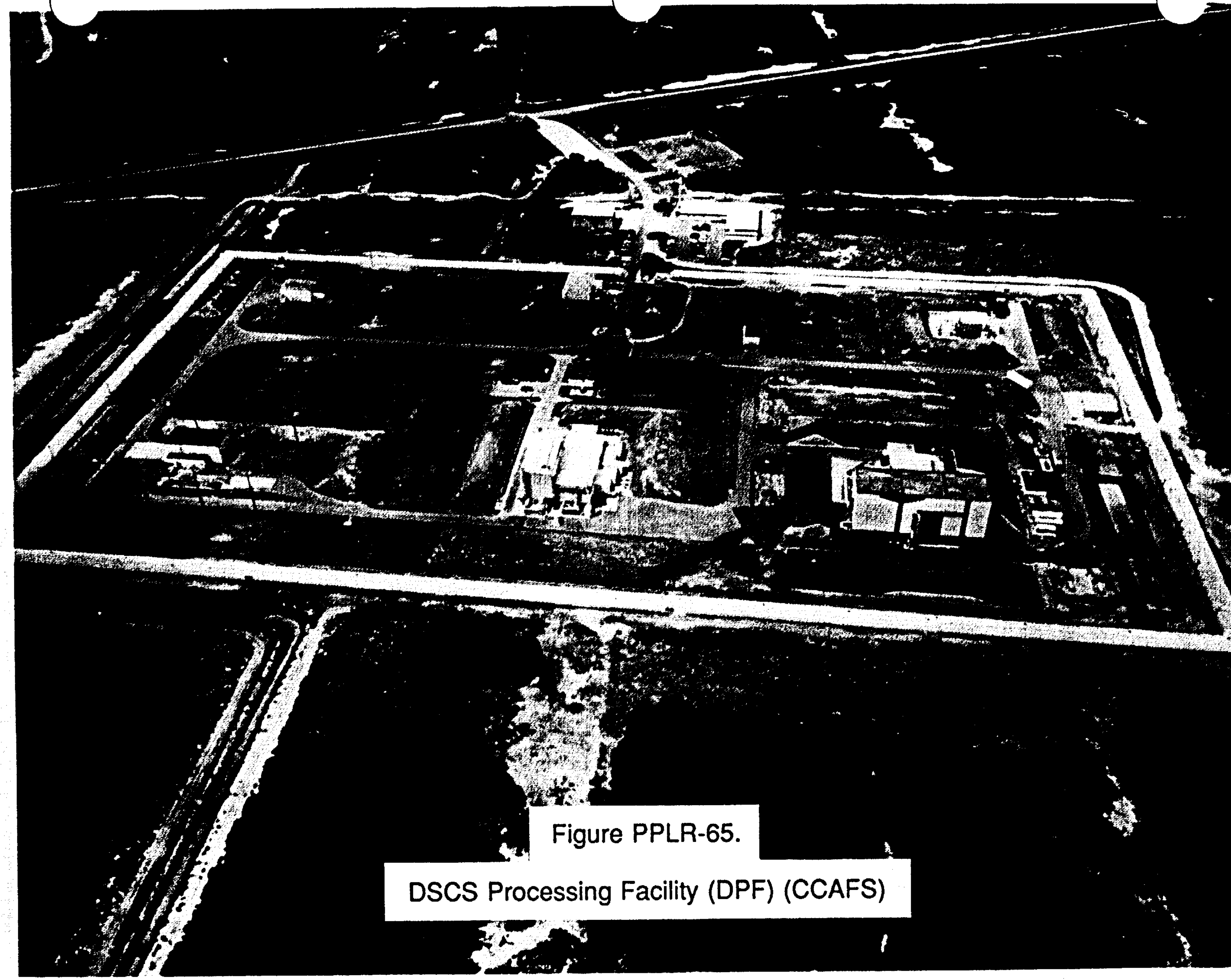


Figure PPLR-65.

DSCS Processing Facility (DPF) (CCAFS)

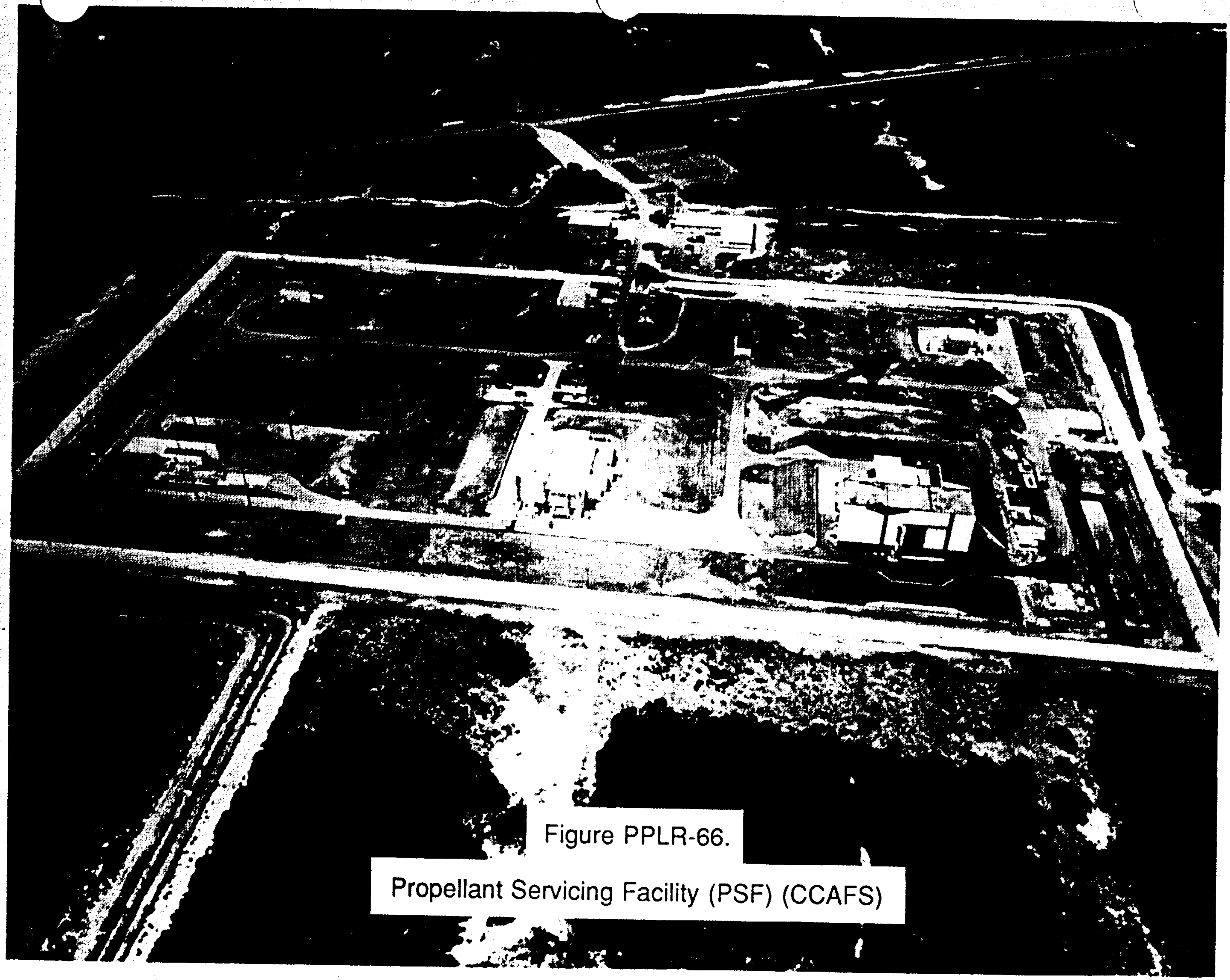


Figure PPLR-66.

Propellant Servicing Facility (PSF) (CCAFS)

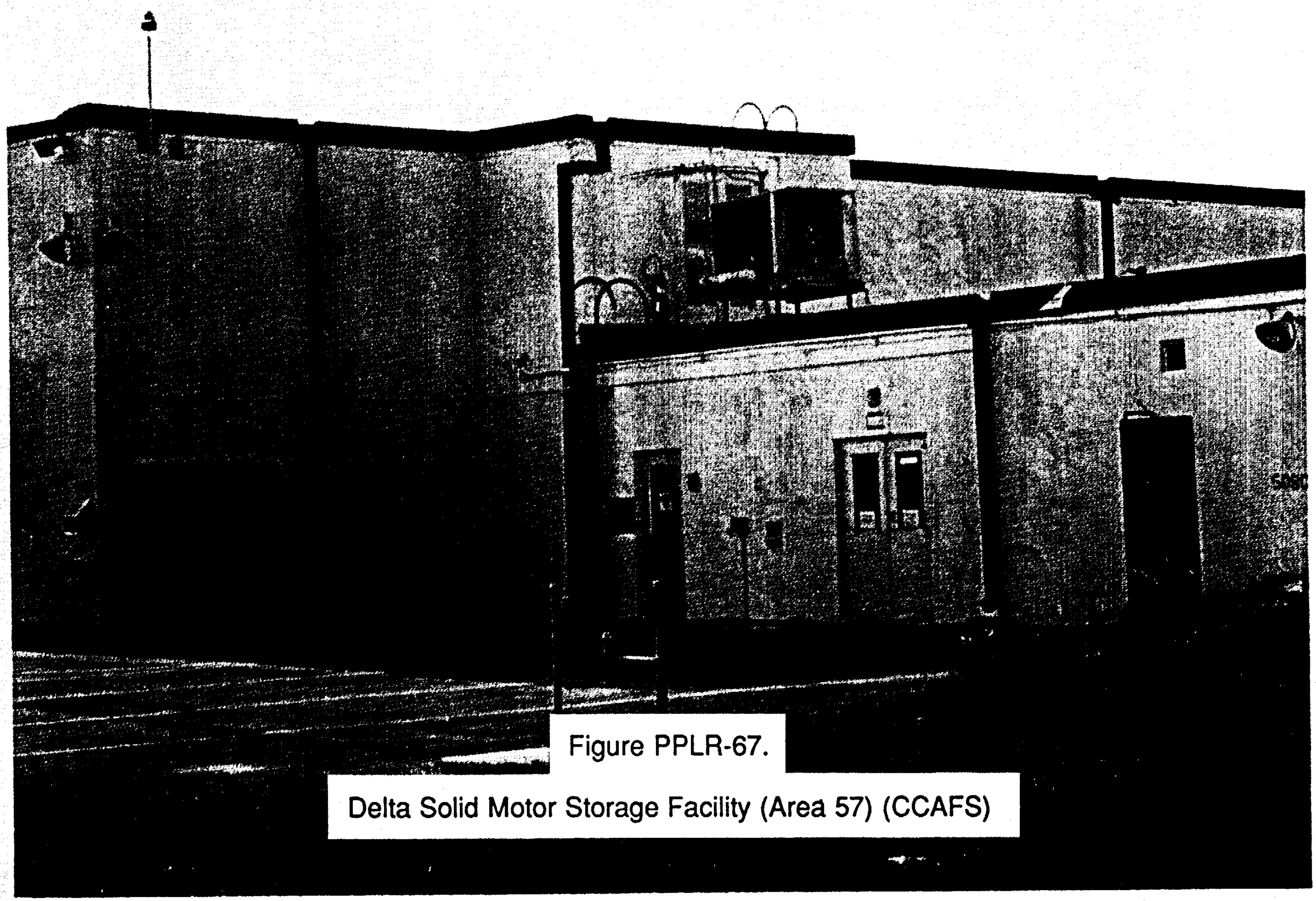


Figure PPLR-67.

Delta Solid Motor Storage Facility (Area 57) (CCAFS)

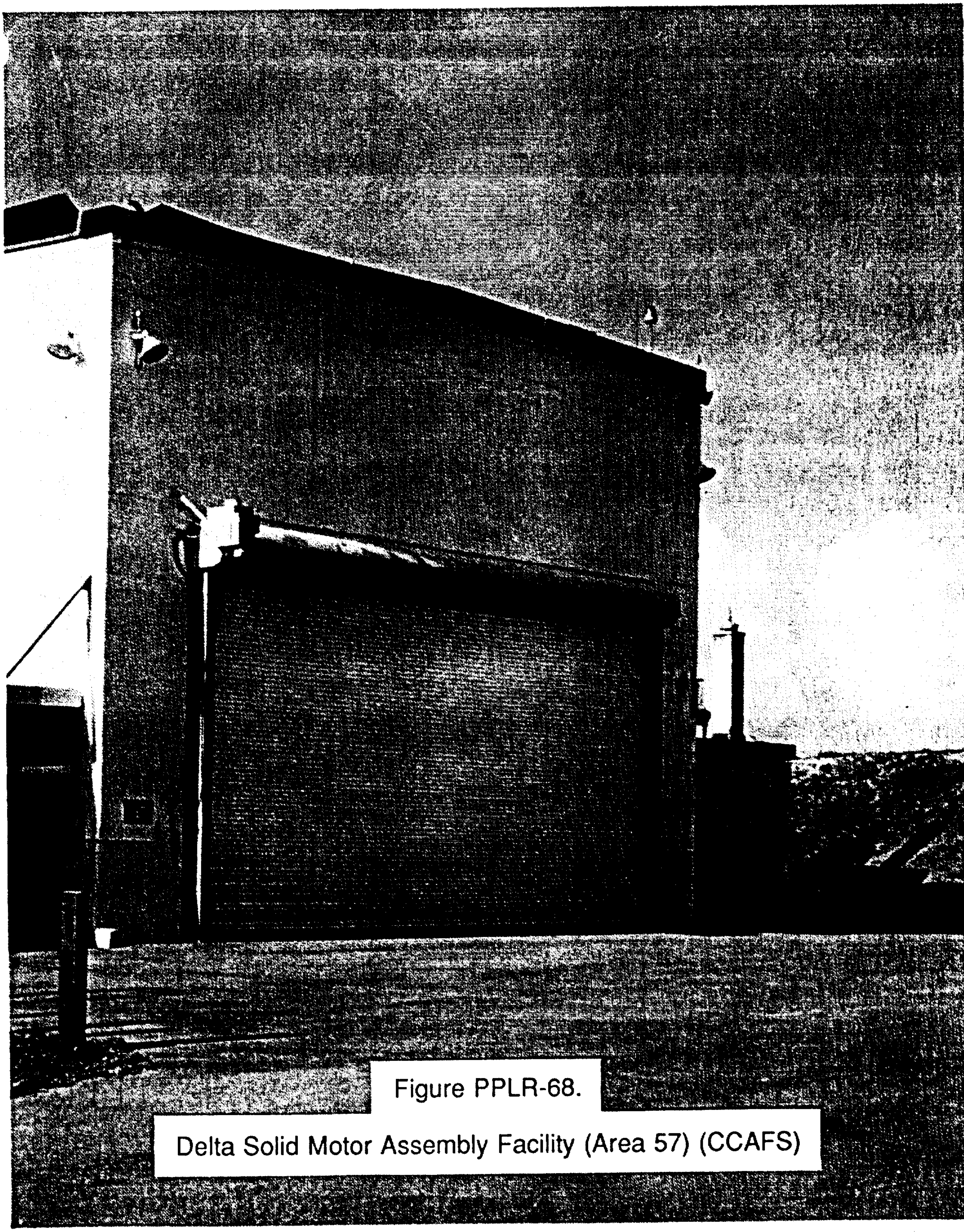


Figure PPLR-68.

Delta Solid Motor Assembly Facility (Area 57) (CCAFS)

Figure PPLR-69.

Abandon Launch Silos (Typical) (VAFB)

Figure PPLR-85.

Hangar J (CCAFS)

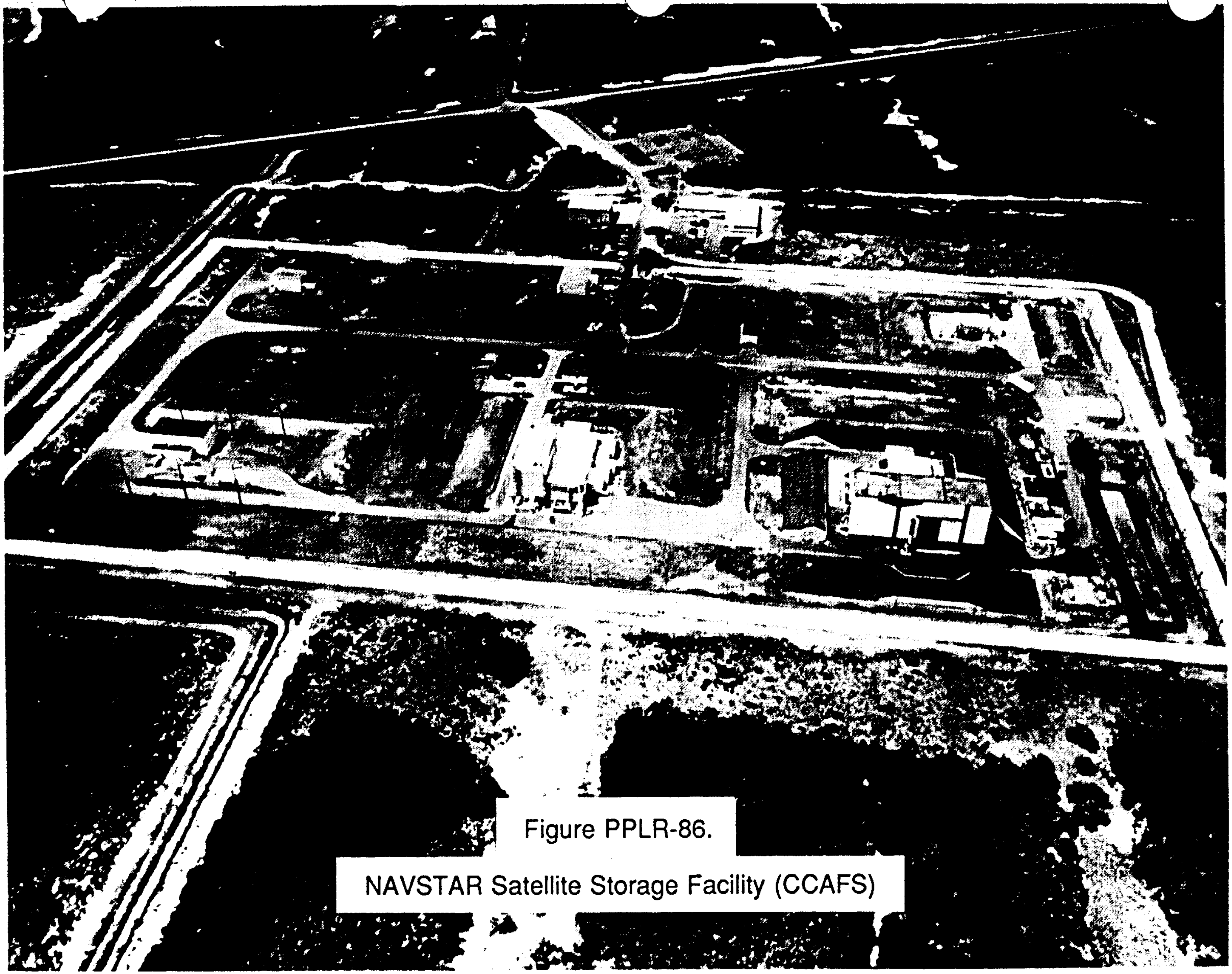


Figure PPLR-86.

NAVSTAR Satellite Storage Facility (CCAFS)

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

CATEGORY 2's

The following list of facilities represents those facilities where the team recommends further study is required to determine disposition.

NATIONAL FACILITIES STUDY
PAYLOAD PROCESSING/LAUNCH/RECOVERY
WORKING GROUP

Number	Title	Category
1	Close/Replace Bermuda, Merritt Island, and Ponce De Leon Stations With a Simpler Infrastructure	2
2	Relocate NASA Shuttle Logistics Depot (NSLD)	2
3	Change to the Operations and Checkout (O&C) Building	2
4	Study Transfer of KSC, CCAFS, and VAFB Railroad Ops to Private Industry	2
5	Determine Future Utilization of the Explosive Safe Area 60A (ESA 60A)	2
6	Determine Future Utilization of the High-Energy Radiological Facility (HERF)	2
7	Determine Future Utilization of Hangars AO and AM	2
8	Determine Future Utilization of the Payload Spin Test Facility Replacement (PSTF-R)	2
9	Share Launch Operations Control Center (LOCC)	2
10	Share Use of Hangar K	2
11	Share Titan Facilities with Delta Launch Programs	2
12	Close the Skid Strip	2
13	Share Weather Station	2
14	Consider Development of a Multi-Purpose Launch Complex	2
15	Expand Use of Titan X-Ray Facility	2
16	Consolidate Use of Payload Test Facilities	2
17	Consolidate Machine Shops at East and West Coast Ranges	2
18	Consolidated Use of Payload Fairing Buildings	2
19	Consolidate Booster Support, Hazardous Waste, Ordnance, and Flammable Storage	2
20	Modify SLC 36A for Commercial Atlas Launches	2
21	Facilities to Support Single-Stage-to-Orbit (SSTO) Program	2

CLOSE/REPLACE BERMUDA, MERRITT ISLAND, AND PONCE DE LEON STATIONS WITH A SIMPLER INFRASTRUCTURE
(AIR FORCE, NASA)

The current system for supporting Shuttle launches is very manpower intensive and expensive. Annual maintenance and operations costs are $14.5 million for Merritt Island/Ponce De Leon and $8.5 million for Bermuda.

The period of actual launch support from these stations is very short (less than 20 minutes). However, continuous telemetry coverage is critical to monitor main engine performance. Angle tracking and C-Band radar data is essential to track the Shuttle during launch for trajectory and range safety. Tracking data provides a solution to about 100-meter accuracy to the astronauts for abort decisions. The Tracking and Data Relay Satellite (TDRS) system cannot be used for Shuttle launch support because the external tank blocks the antenna from view of TDRS until after the roll maneuver is complete. The Shuttle receivers require about 20 seconds to reacquire the signal if it is lost. Ponce De Leon is required because the exhaust gas plume attenuates the signal path to Merritt Island during part of the launch. The TDRS direct view occurs typically after Merritt Island/Ponce De Leon loss of signal and after acquisition by Bermuda (prime for low inclination orbit launches) or Wallops (high inclination orbit launches). Therefore, the Shuttle transponder is set in the "ground support mode" and is switched manually to the "TDRS mode" downrange after the maneuver is complete.

The equipment complement to support Shuttle launches consists of a 9-meter antenna, S-Band transmit/receive equipment, C-Band radar, VHF communications equipment, range safety equipment, and command destruct transmitter.

The Air Force is preparing to replace their range equipment with automated stations for command and telemetry. Data will be sent via "bent pipe" to/from a central control center. Tracking will be provided by GPS. This funded program plans to replace the Antigua and Ascension stations during 1996/97 time period. A companion activity is underway to replace the current ELV telecommunications systems with modern, digital systems, including a high degree of autonomy. There may be an advantage to the total cost to the Government for the Shuttle to utilize this ground equipment, either operated by the Air Force or by NASA. However, it may be cost effective to install an interim system to cover the period between 1995 (assumed operational readiness date for the interim system) and 1998 (probable earliest deployment of an RSA system).

It may be possible to install a new station at a location that can satisfy coverage requirements for both Merritt Island and Ponce De Leon. This option should be investigated. Also, pad payload testing might be better served from a different location than the launch support station or could be portable, depending on the pad served. In either case, the new system must be simpler, less manpower intensive, and less costly than the current system.

The task consists of two steps. The first step, which will be completed in late April, 1994 by NASA and Air Force teams working independently, will critically examine each Shuttle and Range requirement. Those requirements that are deemed to be absolutely essential will be documented and delivered to an implementation team consisting of senior technical experts from both the Air Force and NASA. This team will develop an implementation approach and operational concept by late September, 1994 to best satisfy the requirements. See Figures PPLR-70 and PPLR-71.

CLOSE/REPLACE BERMUDA, MER... IT ISLAND, AND PONCE DE LEC... STATIONS WITH A SIMPLER INFRASTRUCTURE
(AIR FORCE, NASA)

DESCRIPTION: These facilities provide command, control, and radar tracking support to both NASA and DoD and communications and tracking support to NASA. Recommendation is to study the feasibility of replacing these facilities with simpler, modern, fixed or mobile remote unmanned installations which are not incompatible with the Air Force RSA initiative.

PAYOFF POTENTIAL:
- Cost savings to Space program.

COST SUMMARY:
- Implementation costs: $18M - $25M (2 or 3 sites).
- Total O&M cost today is $23M/Yr.
- Estimated future O&M cost: $3M/Yr. (exclusive of communications costs).
- Anticipated net savings: $18 - $20 M/Yr.

PROS:
- O&M cost savings.
- Improved reliability.
- Standardized system (logistics, training, etc.) for Shuttle support.

CONS:
- None identified.

STEPS TO MAKE IT HAPPEN:
- Review of Shuttle and Range requirements.
- Joint NASA/Air Force team to conduct study to determine if fewer sites can be located to cover existing infrastructure requirements.
- Team to coordinate infrastructure approach with Air Force Range Standardization and Automation (RSA) initiative.

TASK GROUP RECOMMENDATION: NASA and the Air Force to create multi-agency team and conduct study to replace existing system and infrastructure with simpler infrastructure approach. Develop several options and evaluate with recommendation.

DATE: 11/18/93 **REV:** 04/06/94 **CAT:** 2

RELOCATE NASA SHUTTLE LOGISTICS DEPOT (NSLD)
(NASA/AIR FORCE) (KSC) (CCAFS)

The NASA Shuttle Logistics Depot (NSLD) comprises six buildings operated by Rockwell International Space Systems Division. The NSLD, located in the city of Cape Canaveral, is a repair, maintenance, and refurbishment center for Orbiter components removed during processing at the Orbiter Processing Facility. The NSLD performs such tasks as repair, modification, and testing of Orbiter flight components; depot parts manufacturing; failure analysis; materials and process engineering and labs; management of spares assets; procurement of spares; packaging, receiving, shipping, and transportation; spares warehousing; and GSE/spares manufacturing. Building 1 is a 160,320-square-foot facility that contains a 36,500-square-foot mechanical shop, a 38,400-square-foot shop support area, a 33,900-square-foot avionics shop, and a 51,520-square-foot administrative area. Building 2 is a two-story 63,000-square foot facility that contains offices and areas for Human Resources, Advanced Programs, Wellness Center, Material and Process Lab, and Integrated Logistics and Finance and Administration offices. Building 3 is a 12,000-square-foot building that contains Space Station project offices, shipping container and bulk storage areas, Cryogenic Lab, and high pressure/high flow test facility. Building 4 is an 11,000-square-foot facility that is a storage area for large flight hardware items. Building 5 is an 11,000-square-foot receiving/inspection and packaging/crating facility. Building 6 is an 11,000-square-foot facility used for metal storage, metal cutting, and heat treating. The NSLD function was transitioned to Cape Canaveral from Downey California (1984-1989).

Currently, the cost to lease the six NSLD buildings is approximately $2 million per year. Also, the distance between the NSLD and the LC-39 area causes inefficient operations; specifically, repaired parts must be packed/crated, transported to the launch site, and then unpacked/uncrated. The inefficiency of performing NSLD operations offsite is estimated to cost approximately $1.9 million per year. NASA has proposed building a facility in the LC-39 area, which would cost approximately $15 million. If an existing suitable Government facility near the LC-39 area were available and could be modified to duplicate the existing capabilities of the NSLD facilities, then the NSLD should be relocated to save the leasing costs and provide more efficient operations.

See Figure PPLR-72.

RELOCATE NASA SHUTTLE LOGISTICS DEPOT (NSLD)
(NASA/AIR FORCE) (KSC) (CCAFS)

DESCRIPTION: The NSLD comprises six leased buildings with a total area of 269,000 square feet. It is operated by Rockwell (RIC) and is located in the city of Cape Canaveral. The facility is used to perform repair and maintenance on approximately 3200 line replaceable units removed from the Orbiter. This recommendation is to relocate the operation to an existing on-site Government facility(s), thereby saving leasing and operational inefficiency costs.

PAYOFF POTENTIAL:
- Cost savings to the STS program.

COST SUMMARY:
- Implementation cost: TBD.
- Cost of O&M = $5.3 M/Yr estimate (includes approximately $2 M/Yr leasing cost).
- Cost of operational inefficiency = $1.9 M/Yr estimate.

PROS:
- Relocation of function to an existing Government facility(s) near LC-39 area would save lease cost plus cost incurred due to operational inefficiencies (i.e., packing/crating at NSLD, travel time for parts between NSLD and LC-39, etc.).
- More efficient operations near launch area.

CONS:
- None identified.

STEPS TO MAKE IT HAPPEN:
- KSC/AF Space Utilization Offices to locate suitable existing Government facilities near LC-39 or within Government lands.
- KSC to develop cost trades with final recommendations.

TASK GROUP RECOMMENDATION: Evaluate/locate existing facilities on KSC or CCAFS to provide required space and relocate the NSLD operations.

DATE: 11/18/93 **REV:** 12/6/93 **CAT:** 2

CHANGE TO THE OPERATIONS AND CHECKOUT (O&C) BUILDING
(NASA) (KSC)

The O&C Building is a five-story structure containing 602,000 square feet of offices, laboratories, astronaut quarters, and payload bay areas. It is in the KSC Industrial Area immediately east of the KSC Headquarters Building. The O&C Building bay area was used for assembly and test of the Apollo spacecraft during the Apollo Program and has been modified for the Space Shuttle era.

Payloads that are integrated and processed horizontally are received, assembled, and checked out in the O&C Building. They are then transported either to the Orbiter Processing Facility (OPF) for mating with the Orbiter or to the Vertical Processing Facility (VPF) to be combined with vertically processed payloads. The O&C Building has been modified to accommodate pallet-type payloads including special structures, Spacelab configurations, and certain other Space Shuttle payloads. These payloads are generally processed through experiment-to-pallet, pallet-to-total payload, and payload-to-simulated Orbiter integration and postlanding deintegration.

C-5.

Actual hands-on mechanical and electrical experiment and payload integration are performed primarily in the bay area. Laboratories and shops provide the offline payload support to the integration conducted in the bay area. Control and monitor functions are provided in support of the bay integration. The service area contains support systems for the bay area such as shipping and receiving.

After the Space Station Processing Facility (SSPF) construction and activation is completed in 1994, the O&C manifest changes and there is potential for consolidation of other program requirements into the O&C to more efficiently support the mission model at KSC.

See Figure PPLR-74.

CHANGE TO THE OPERATIONS ⸺D CHECKOUT (O&C) BUILDING
(NASA) (KSC)

DESCRIPTION: The O&C Payload Processing Facility has large low bay and high bay class 100,000 clean rooms, with associated control rooms and office space. The facility is used today for "online" payload processing and integration. After the Space Station Processing Facility (SSPF) construction is completed in 1994, the O&C manifest changes and there is potential for consolidation of other program requirements into the O&C to more efficiently support the mission model at KSC.

PAYOFF POTENTIAL: - Cost savings

COST SUMMARY:
- Implementation cost: TBD.
- O&M cost: TBD.
- Associated net savings: TBD.

PROS:
- Consolidation on site for better use of facilities.
- Lower operation cost.

CONS:
- None identified.

STEPS TO MAKE IT HAPPEN: - NASA/KSC to form a team to identify and develop a plan for consolidation of program requirements to utilize the O&C Building.

TASK GROUP RECOMMENDATION: NASA/KSC form a team to study future use of the O&C Building.

DATE: 12/6/93 **REV:** **CAT:** 2

STUDY TRANSFER OF KSC, CCAFS, AND VAFB RAILROAD OPS TO PRIVATE INDUSTRY
(DOD, NASA, DOT) (KSC) (VAFB) (CCAFS)

KSC's railroad system consists of 40 miles of track on Government property, most of which has been refurbished and upgraded within the last few years. The upgrades were primarily in support of delivery of solid rocket booster segments for STS at KSC and for delivery of Titan rocket components into the ITL facilities supporting Titan vehicle operations. The KSC rolling stock consists of 3 diesel electric locomotives and approximately 60 railcars made up of specialty items, such as liquid hydrogen tankers, gaseous helium tubebanks, flatbed spacer cars, and various cars built to carry space hardware.

The railbed and trackage is maintained by Florida East Coast Railroad under contract to NASA. The rolling stock is operated and maintained by dedicated Base Operations Contract personnel under NASA contract NAS10-12000. The rolling stock is mostly equipment which has been procured off Government excess, refurbished, and put into service. In addition to maintaining NASA equipment, the railway crew also performs reimbursable services for CCAFS and others.

Costs for the KSC operation in FY 93 were $757,000, consisting of $583,000 for O&M manpower and $174,000 for material and other costs. It is proposed that the contract for railbed and track maintenance remain unchanged, but that the rolling stock maintenance and railroad operations also be contracted out to a private railroad company, rather than NASA maintaining a dedicated crew. It is felt that the net cost to the Government would be less using this approach. The exact cost of this option has not been determined yet and NASA/KSC should undertake a study to determine its feasibility and cost effectiveness.

Vandenberg AFB railroad operations consist of 26 miles of track on Government property, 2 locomotives, and 0 railcars. VAFB operations consist of 9 military personnel and 4 contractor types. O&M to maintain switcher certification is estimated at $46 K/year. and track service and alignment at $130 K/year.

See Figure PPLR-75.

STUDY TRANSFER OF KSC, CC .FS, AND VAFB RAILROAD OPS TO PRIVATE INDUSTRY

(DOD, NASA, DOT) (KSC) (VAFB) (CCAFS)

DESCRIPTION: NASA/KSC Railroad Operations: This railroad system consists of 42 miles of track on government property, 3 diesel electric locomotives, and approx. 60 railcars. O&M of the locomotives and railcars is accomplished by a dedicated Base Operations Contract crew. Rail and railbed system maintained by contract with Florida East Coast Railroad. VAFB Railroad Operations: Railroad system has 26 miles of track on Government property, 2 locomotives, and 0 railcars. O&M is accomplished by a crew of 9 Air Force personnel and 4 contractors. CCAFS Railroad Operations: TBD.

PAYOFF POTENTIAL: - Cost savings to NASA/DOD programs.

COST SUMMARY:
- Implementation costs: TBD.
- KSC O&M costs: $757K/Yr.
- VAFB O&M costs: $176K/Yr.
- CCAFS O&M costs: TBD.
- Anticipated savings: TBD

PROS:
- Transfer of operations requirements from in-house to contract with railroad company eliminates need for NASA and DOD to maintain expertise and capability.
- Potential significant cost reduction.

CONS: - None Identified.

STEPS TO MAKE IT HAPPEN:
- NASA and DOD to create interagency study team to study/develop plan for changeover from Government railroad support to private industry support.
- Study team to perform option/cost analyses and make recommendations.

TASK GROUP RECOMMENDATION: DOD and NASA/KSC initiate study to determine cost of contracting out operation support to railroad company.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

P1/WP51/STENIS-2.1A

DETERMINE FUTURE UTILIZATION OF THE EXPLOSIVE SAFE AREA 60A (ESA 60A)
(AIR FORCE/NASA/DOT) (CCAFS)

The ESA 60A is located on Cape Canaveral Air Force Station and is a fenced, secured hazardous (hypergol and solid ordnance) processing facility. This facility was designed and constructed to accommodate ordnance installation, loading of liquid propellants (hypergols), hazardous systems tests and checkout, buildup, mating, and alignment of a payload to a solid propellant motor, spin-balance of a payload and/or its solid motor assembly, and other potentially explosive or hazardous operations: ESA-60 consists of:

<u>The Sterilization and Assembly Building</u>
- Two 2,200 sq. ft. clean rooms with 39-ft. ceilings
- A 1,200 sq. ft. air lock between the two clean rooms
- An additional 400 sq. ft. of support space

<u>The Dynamic Balance Lab</u>
- One 1,080 sq. ft. clean room with a 30-ft. ceiling
- An additional 200 sq. ft. of support space

<u>The Control Support Building</u>
- Approximately 1,200 sq. ft. of office space

<u>The Ground Support Equipment Storage and Maintenance Building</u>
- Approximately 1,500 sq. ft. of work space with power and compressed air

The last NASA payload to process through this area (WIND) will finish in June 1994. Negotiations are in process with the Air Force to turn this facility over to them in June of 1994 after the NASA payload WIND processes through the facility.

See Figure PPLR-77.

DETERMINE FUTURE UTILIZA(ƆN OF THE EXPLOSIVE SAFE AREA 60A (ESA 60A)
(AIR FORCE/NASA/DOT) (CCAFS)

DESCRIPTION: The Explosive Safe Area 60A (ESA 60A) is located on Cape Canaveral Air Force Station (CCAFS), Florida and is within a fenced, secured area with four separate buildings: The Safe and Arm Building (S&A), with one airlock and two high bays; the Dynamic Balance Building (DBL); the Control Building; and a Storage Building. The S&A and DBL are hazardous processing buildings and are sited for solid ordnance and hypergol operations. This NASA facility is scheduled to be turned over to the Air Force after the NASA solar wind payload ("WIND") processes through in June 1994.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:
- Implementation cost: none.
- O&M costs: $640 K/Yr.
- Anticipated net savings: TBD

PROS:
- Reduces NASA payload facility costs.
- Provides available facility for DOD or commercial use.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - AF/CCAFS and NASA/KSC to determine facility usage.

TASK GROUP RECOMMENDATION: NASA/KSC and AF/CCAFS to form a joint facility utilization panel to determine future use of this facility.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

DETERMINE FUTURE UTILIZATION OF THE HIGH-ENERGY RADIOLOGICAL FACILITY (HERF)
(AIR FORCE/NASA/DOT) (CCAFS)

The High-Energy Radiological Facility (HERF) located on CCAFS was built by NASA and activated in 1990 as a replacement to the old, outdated, and obsolete "BETATRON" unit which had been utilized for many years. The replacement was prompted by a series of failures which required extraordinary efforts to repair due to unavailability of repair parts. The old unit also had less capability to handle larger size motor segments such as INTELSAT VI motors which were too large to be handled safely.

The HERF has a 40-foot x 50-foot highbay with a 52-foot height. The walls are 6-feet, 8-inches thick concrete with a 20-foot x 18-foot x 6.5-foot equipment/test part door. The roof is 3-feet thick concrete. It contains a 2-ton telescopic bridge crane for manipulating a LINAC, Model 300A, 6, 9, and 11 MEV, x-ray unit, which can penetrate 14-inch steel. The HERF is equipped with a 25-ton bridge crane for manipulating test articles and a 25-ton, 12-foot-diameter turntable. The facility is also equipped with safety interlock systems radiation warning systems, closed circuit TV monitoring, photographic processing capability, and personnel locker rooms and offices for radiography processing support.

The HERF has been used to x-ray large solid ordnance segments, such as the Boeing IUS, Delta kick motors, and other large devices. From February 1990 to January 1994, a total of 42 solid motors will have been processed through the HERF. The NASA manifest presently reflects that there is little or no requirement in the foreseeable future for HERF radiographic services for NASA payloads. Consequently, NASA has initiated an effort to transfer responsibility for the HERF to the Air Force since there are still requirements for services to AF customers. As part of that decision making process, the Air Force will consider whether the HERF offers unique capabilities which cannot be satisfied using other means such as using the Titan x-ray facility. If the Titan complex could be used to satisfy all radiography requirements, the HERF facility could be used for other purposes such as solid segment storage. Consequently, the Air Force/CCAFS and NASA/KSC should form a joint facility utilization panel to determine the best option.

Cost for operating and maintaining this facility is approximately $411,000 per year. No significant savings would be seen due to this realignment, unless commercial launch services utilization is increased, whereby the O&M costs could be spread over a broader base.

See Figure PPLR-78.

DETERMINE FUTURE UTILIZATION OF THE HIGH-ENERGY RADIOLOGICAL FACILITY (HERF)
(AIR FORCE/NASA/DOT) (CCAFS)

DESCRIPTION: The High-Energy Radiological Facility (HERF) is located in the Cape Canaveral Air Force Station (CCAFS) Solid Ordnance area. Contains a high-energy x-ray machine (Linitron) used to x-ray large solid ordnance segments (such as the Boeing IUS, Delta kick motors, and other large physical devices). Since the mission model shows few NASA payloads with large solid rocket motors, NASA has determined this facility is no longer needed for its purposes. The USAF is evaluating whether to continue using the HERF capability or transfer all work to the Titan X-Ray facility.

PAYOFF POTENTIAL: Cost savings.

COST SUMMARY:
- Implementation costs: None.
- O&M costs: $411 K/Yr.
- Anticipated savings: TBD

PROS:
- Increased small SRM buildup capability.
- No NASA use projected. USAF has an identified need.
- New facility remains in use.

CONS:
- If Titan X-Ray facility assumes all HERF tasks, potential schedule conflicts could occur.
- No O&M cost savings unless turned over to commercial use.

STEPS TO MAKE IT HAPPEN:
- KSC to negotiate turnover to Air Force.
- USAF evaluate user requirements for HERF/Titan X-Ray facility.

TASK GROUP RECOMMENDATION: NASA/KSC and AF/CCAFS form a joint facility utilization panel to determine future utilization of this facility.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

DETERMINE FUTURE UTILIZATION OF HANGARS AO AND AM
(AIR FORCE/NASA/DOT) (CCAFS)

Hangars AO and AM are large, class 100,000, nonhazardous clean room processing facilities with control rooms and two floors of offices at Cape Canaveral Air Force Station on Hangar Road. Due to the decreasing volume of NASA payloads on Orbiters and Expendable Launch Vehicles, Hangars AO and AM are planned to be turned over to the Air Force in FY 95 and FY 98 respectively. Until the above date, the hangars are required to support the mission model.

Building AM is on Hangar Road south of CCAFS Industry Road. This facility is a two-story, concrete block and steel frame building that was constructed by NASA in 1963. The overall first floor dimensions are 188 feet by 100 feet. The area is fenced and lighted. Building AM is generally used for prelaunch preparation and checkout of medium-sized payloads. Payloads flown on expendable launch vehicles have previously used the entire facility; however, KSC has functionally, but not physically, divided Building AM so that two payloads may be processed at the same time.

Building AO is also on Hangar Road south of CCAFS Industry Road. Building AO was acquired by NASA through a NASA/Department of Defense (DOD) agreement. Extensive modifications have since expanded the payload checkout and test capabilities. Building AO is constructed with steel frame and concrete masonry block. The overall first floor dimensions are 180 feet by 189 feet. The area is fenced and lighted. Building AO is generally used for prelaunch preparation and checkout of payloads for both Space Shuttle and unmanned (expendable) launches. The 7,875-square-foot high bay is functionally but not physically divided into north and south sections or, if necessary, the entire bay may be used for larger payloads. Simultaneous payload processing is planned in the two sections.

See Figures PPLR-79 and PPLR-80.

DETERMINE FUTURE UTILIZA..JN OF HANGARS AO AND AM
(AIR FORCE/NASA/DOT) (CCAFS)

DESCRIPTION: Hangars AO and AM are large nonhazardous spacecraft payload clean room processing facilities located on Cape Canaveral Air Force Station (CCAFS) and are presently utilized by NASA. However, there are no NASA payloads scheduled for Hangar AO after FY95, and no payloads scheduled for Hangar AM after Dec. 1998.

PAYOFF POTENTIAL:
- Cost savings.
- Unused facility space available.

COST SUMMARY:
- Implementation cost: TBD.
- O&M costs: AO - $812 K/Yr., AM - $650 K/Yr.
- Anticipated savings: TBD.

PROS:
- Maintained conditioned storage could reduce degradation of equipment stored elsewhere.
- Use of office space could reduce reliance/lease costs associated with Air Force modular trailers.
- Potential for use by commercial.

CONS:
- None identified.

STEPS TO MAKE IT HAPPEN:
- AF/CCAFS and NASA/KSC to determine facility usage.
- NASA/Air Force to develop transition and utilization plan, including trades/costs and recommendations.

TASK GROUP RECOMMENDATION: NASA/KSC and AF/CCAFS form a joint facility utilization panel to determine future utilization of this facility.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

DETERMINE FUTURE UTILIZATION OF THE PAYLOAD SPIN TEST FACILITY REPLACEMENT (PSTF-R)
(NASA) (KSC)

The PSTF-R, which is now under construction, was designed to process generic and Space Station payloads loaded with hypergolic propellants. The PSTF-R consists of the Hazardous Processing Facility (HPF) and the Hazardous Operations Support Facility (HOSF). The HPF is the facility in which the payload would be processed and the HOSF is the facility in which the HPF operations would be controlled/monitored. The HOSF is located approximately a quarter of a mile south of the HPF. Also, in the area just south (approximately 100 feet) of the HPF exists a fuel transfer shed. The PSTF-R construction completion date is April 1, 1994.

The HPF is a 15,000 square-foot facility containing a 136-foot long by 60-foot wide by 62-foot high high bay; a 36-foot long by 60-foot wide by 20-foot high low bay divided into two rooms of approximately equal size for GSE and flight hardware component storage; and approximately 1,000 square feet of office space. The HPF can be used for servicing two monopropellant payloads simultaneously while providing storage/depressurization for another payload. The high bay and low bay are designated a class 100,000, level 4, clean work area. The high bay contains a 20-ton bridge crane with 50-foot hook height. The HPF is sited to handle 29,000 pounds of hydrazine to be processed through the high bay via the fuel transfer shed. The HPF is also sited to handle oxidizer of an equivalent amount to the fuel and has already been scarred for future construction of an oxidizer transfer shed. Facility system support includes: administrative, communication, vacuum, CCS, OIS-D, wideband fiber optics, P&AW, ESS, UPS, environmental control system, hypergolic spill containment system, hypergolic fire detection/protection, 60 Hz power, compressed air, toxic vent system, breathing air, timing and countdown, and GN_2/GHe. The HOSF is a 13,500 square-foot facility attached to the existing control facility supporting the operations in the Payload Hazardous Servicing Facility (PHSF). The HOSF contains approximately 5,600 square feet of raised floor for control room space and the remaining space is mainly office space. The HOSF also contains approximately 3,600 square feet of unfinished area.

The PSTF-R is being considered as a payload (P/L) processing facility for Shuttle and Expendable Launch Vehicle P/L's.

GSE and activation have been put on hold until utilization has been determined.

See Figure PPLR-81.

DETERMINE FUTURE UTILIZATION OF THE PAYLOAD SPIN TEST FACILITY REPLACEMENT (PSTF-R)
(NASA) (KSC)

DESCRIPTION: Construction on this hazardous processing facility is essentially complete. The facility was built to process Space Station payloads and propulsion modules. Changes in the Space Station program have stopped the activation funds for completing this facility. KSC is presently reviewing the utilization of this facility in accordance with other program requirements.

PAYOFF POTENTIAL: - TBD.

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: TBD.
- Anticipated net savings: TBD.

PROS: - TBD.

CONS: - None identified.

STEPS TO MAKE IT HAPPEN: - KSC determine utilization of facility.

TASK GROUP RECOMMENDATION: KSC to determine utilization of this facility.

DATE: 12/6/93 **REV:** 1/13/94 (a) **CAT:** 2

SHARE LAUNCH OPERATIONS CONTROL CENTER (LOCC)

(AIR FORCE) (CCAFS)

This facility was constructed in 1965 to support NASA programs. In the mid 1970s a major addition was added to house the consolidated launch operations for the Shuttle-Centaur program. In the mid-1980's the facility was converted to a Titan IV (TIV) consolidated launch operations control center housing the telemetry ground station and ground processing computers (2 Harris 1200 mainframes) for the Centaur high energy upper stage, the primary ground processing computer for the TIV core vehicle (on the first floor inside a 100 decibel radio frequency shield room), and a launch control center from which processing or launch control is performed as well as the monitoring of launches from the Atlas and Delta launch complexes. The second floor consists of a Spacecraft Control Center, used to monitor payload health data and trajectory information, a communications room with fiber optics and encryption capability, and an operations monitoring facility.

See Figure PPLR-82.

FILE: LOCC1

SHARE LAUNCH OPERATIONS CONTROL CENTER (LOCC)

(AIR FORCE) (CCAFS)

DESCRIPTION: This facility provides the main command, control, and communications facility for the Titan IV program and supports all phases of the processing of the Titan IV launch vehicle stack. A study is under way to move the Launch Management functions to the Range Operations Control Center (ROCC) thereby freeing up a portion of the second floor for other potential users.

PAYOFF POTENTIAL: - Operations efficiency.

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: $354K/YR.
- Anticipated net savings: TBD.

PROS: - Better utilization of facilities.

CONS: - Implementation costs.

STEPS TO MAKE IT HAPPEN:
- 45 SPW complete on-going study.
- 45 SPW determine options/costs and make recommendations for potential shared uses.

TASK GROUP RECOMMENDATION: Continue study by 45 SPW for potential shared use.

DATE: 12/06/93 **REV:** 1/13/94 **CAT:** 2

FILE: LOCC

SHARE USE OF HANGAR K

(AIR FORCE/GENERAL DYNAMICS/DOT) (CCAFS)

This facility supports the mission model for the Air Force Atlas launch program and the commercial Atlas program.

Hangar K consists of a high bay (hangar floor) area located between two 2 story wings which house administrative personnel. Currently the hangar floor area houses a General Dynamic's machine shop, which has already been shut down and is in the process of being dismantled. General Dynamics (GD) will no longer operate a machine shop at CCAFS (future requirements will be contracted out). One of the options GD is considering is the possibility of relocating the spare parts storage area from its current location on CCAFS to Hangar K. If that happens, Hangar K will then be fully utilized. The administrative wings are already fully utilized and are occupied by GD personnel in support of both the Air Force and commercial Atlas programs.

See Figure PPLR-83.

FILE: HGRK1

SHARE USE OF HANGAR K

(AIR FORCE/GENERAL DYNAMICS/DOT) (CCAFS)

DESCRIPTION: This facility supports the mission model for Atlas launches. General Dynamics plans to shut down their machine shop in this facility thereby making it available for other uses.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: $60K/YR.
- Anticipated net savings: TBD.

PROS: - Better utilization of facility.

CONS: - None.

STEPS TO MAKE IT HAPPEN:
- 45 SPW study shared use.
- 45 SPW develop options/costs and make recommendations.

TASK GROUP RECOMMENDATION: Study by 45 SPW for shared use of Hangar K.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

FILE: HGRK

SHARE TITAN FACILITIES WITH DELTA LAUNCH PROGRAMS

(AIR FORCE) (CCAFS)

The Integrate-Transfer-Launch (ITL) area was constructed for the Titan program in the 1960s. It includes the facilities for the receipt/inspection of the solid rocket motors (SRMs), receipt and vertical checkout of the Titan core, buildup/integration of the SRMs with the core, and two launch pads. The launch vehicle is transferred to and from each area via railroad transporters. Due to a decrease in launch rate, a study is underway to evaluate the shared use of the excess capacity to support medium launch vehicles (MLVs). This option contemplates the sharing of flight hardware processing/launch facilities which do not contain a launch control function. As a result, this option has no impact on the Delta program's current plans to build a new facility (Delta Launch Operations Facility - DLOF) to relocate the Delta launch control function from the blockhouse at space launch complex 17 to the DLOF.

Facilities contained in the ITL area include: Space launch complexes 40 and 41; Vertical Integration Facility (VIB); Solid Motor Assembly Building (SMAB); Solid Motor Assembly Readiness Facility (SMARF); Receipt and Inspection Shop (RIS); Payload Fairing Cleaning Facility; Titan X-Ray Facility; Inertial Upper Stage (IUS) facility--attached to the SMAB; Spacecraft Processing and Integration Facility (SPIF)--attached to the SMAB.

This study will address the funding required to modify the Titan facilities for use by the Delta program as well as any potential schedule impacts between the two programs.

See Figure PPLR-87.

SHARE TITAN FACILITIES WITH DELTA LAUNCH PROGRAMS

(AIR FORCE) (CCAFS)

DESCRIPTION: Study the feasibility of sharing the Titan Integrate-Transfer-Launch (ITL) area with the Medium Launch Vehicle (MLV) programs currently supported by the Delta launch program infrastructure.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: TBD on shared configuration.
- Anticipated net savings: TBD.

PROS:
- Saves $120M by not refurbishing Delta launch complex (circa 2000).
- Saves portion of O&M costs for Delta infrastructure (circa 2000).
- Achieves efficiency by consolidating resources.
- Uses proven, reliable, underutilized facilities.
- Conserves valuable real estate at CCAFS.
- Maintains capacity/flexibility of existing infrastructure to support Titan mission model.

CONS: - Will require initial funding for modifications to facilities and launch vehicles.

STEPS TO MAKE IT HAPPEN:
- 45 SPW continue study to share ITL facilities.
- 45 SPW to develop options/costs and make recommendations.

TASK GROUP RECOMMENDATION: Study by 45 SPW to develop feasibility plan to allow sharing of Titan facilities by Delta launch programs.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

FILE: TITANMLV

CLOSE THE SKID STRIP

(AIR FORCE/NAVY/NASA/OTHER NON-SPACE USERS) (CCAFS) (KSC)

The Skid Strip is a 10,000 foot long runway located at CCAFS. This strip supports the air transportation requirements of space launch programs, ballistic launch programs, weapon systems programs and various special operations for DoD. Since the NASA operated Shuttle Landing Facility (SLF) is located only 13 miles from the Skid Strip there is potential for closing the Skid Strip and sharing the SLF.

A detailed study needs to be made to accurately assess the feasibility of closing the Skid Strip. If the Shuttle Landing Facility (SLF) was used in lieu of the Skid Strip there may be some initial investment costs involved. An initial assessment has revealed the need to spend $680K to repave 7.4 miles of roadway (north of Complex 34 to Complex 39) and widen the turning radius at Complex 39. Also, there may be a need to use an environmentally controlled temporary payload storage area/facility near the SLF (such facilities are presently located within a half mile of the Skid Strip). If an existing facility cannot be shared then one may have to be constructed at an estimated cost of $1.1M (11,000 SF, $100/SF).

The $233K/YR in O&M costs includes 2.5 contractor man years to operate the control tower; also included is the maintenance of the Skid Strip.

See Figure PPLR-88.

FILE: SLF1

CLOSE THE SKID STRIP

(AIR FORCE/NASA/NAVY/OTHER NON-SPACE USERS) (CCAFS) (KSC)

DESCRIPTION: The Skid Strip is an airfield with a 10,000 foot long runway located at CCAFS. The original purpose of the Skid Strip was for remote-pilot recovery of unmanned flight vehicles (circa 1960). Today the Skid Strip supports space launch, ballistic launch, weapon systems and special operations for DoD. Using NASA's Shuttle Landing Facility - SLF (located about 13 miles from the Skid Strip) may allow closure of this facility and consolidation of functions.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: $233K/YR.
- Anticipated net savings: TBD.

PROS:
- SLF has precision navigation aide (none at Skid Strip).
- Eliminates redundant facilities (less than 10% utilized).
- May spread O&M burden on the SLF between more agencies.

CONS:
- Logistics concerns of CCAFS users (potential increased convoy distance and related weather risks depending on payload).
- Potential conflicts in scheduling use of the SLF.
- DoD budget costs for portion of O&M on the SLF may be greater than for the Skid Strip alone.

STEPS TO MAKE IT HAPPEN:
- Joint AF/NASA team to conduct study to determine feasibility of closing Skid Strip and using the SLF.
- Team to develop options costs and recommendations.

TASK GROUP RECOMMENDATION: 45 SPW continue study to evaluate potential closure of the Skid Strip.

DATE: 11/18/93 **REV:** 1/13/94 **CAT:** 2

FILE: SLF

SHARE WEATHER STATION

(AIR FORCE/NAVY/UK) (ASCENSION)

The U.S. Navy requires data collected from this facility to analyze performance of Trident submarine-launched based ballistic missiles. NASA and NOAA also use this facility, to a lesser extent, to obtain atmospheric ozone data.

Rawinsonde balloons are released once daily (1 hr preparation time, 1 hr 30 min flight operations time, and 1 hr post flight operations time).

SHARE WEATHER STATION

(AIR FORCE/NAVY/UK) (ASCENSION)

DESCRIPTION: The U.S. Navy requires data collected from this facility to analyze performance of Trident submarine-launched ballistic missiles. There appears to be some duplication of effort with a Royal Air Force/British Meteorological Office at Ascension. There exists a potential to consolidate (i.e., use the British data) to meet U.S. Navy requirements. There is also a potential to share this facility with some electronic maintenance shops located in the area.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: TBD.
- Anticipated net savings: TBD.

PROS:
- Potential O&M savings from closure of weather station or closure of electronics shops.
- Reduces logistics requirements for downrange support.

CONS: - Reliance on British data for U.S. Navy launches may reduce responsiveness.

STEPS TO MAKE IT HAPPEN:
- 45 SPW complete evaluation.
- 45 SPW negotiate terms of implementation with the Navy/UK.

TASK GROUP RECOMMENDATION: Continue evaluation by 45 SPW to share weather station at Ascension.

DATE: 11/18/93 **REV:** 12/06/93 **CAT:** 2

File: ASCWS

CONSIDER DEVELOPMENT OF A MULTI-PURPOSE LAUNCH COMPLEX
(DOD, NASA, DOT, COMMERCIAL) (VAFB)

This option recommends converting one medium class (3800 to 4500 LB payload) Space Launch Complex (SLC) to a multi-purpose pad for VAFB Delta, Atlas, and Titan vehicles and deactivating two SLCs. This recommendation is based on a projected 50% utilization rate of VAFB medium class SLCs (SLC 3 & 4) through 1998. Development of a multi-purpose launch complex at SLC-3W site is preferable to continuing piece meal upgrades and costly maintenance on existing forty year old facilities. A multi-purpose launch complex can be developed with defined interfaces to support all medium class boosters. The launch vehicle manufacturers and spacecraft developers must design their future hardware to accommodate these interfaces.

Air Force Material Command Space and Missile Center (AFMC-SMC) conducted a Multi-Vehicle Launch Complex study (MVLC) May 18, 1992; developed the generic launch complex concept and defined a generic complex architecture to replace SLC-3W. The conversion would take 33 month and cost $440M including environmental assessment, communications, unique equipment, gaseous nitrogen piping, power, and solid rocket upgrades. Program activation by September 1994 will provide a multi-purpose complex pad by end of CY 1997. A 30 SPW analysis shows that the current programs can be accommodated during construction and would allow an orderly closure of SLC-4W by 1997 and SLC-2W by 1998. The AFMC-SMC study did not address using commercial enterprises as a back-up during transition to a multi-purpose complex.

The MVLC study should be updated to include using a combination of government/commercial operations, optimizing the use of facilities, closing under-utilized complexes, centralize government infrastructure, and developing recommendations for pad construction .

The benefits to be derived from this action are centralized, modernized government infrastructure, increased efficiency from commonalty, simplified interfaces and procedures, and lower life-cycle launch costs. Disadvantages include greater up front cost, developing new integration procedures, and requiring spacecraft users to develop their payload and integration for a launch vehicle environmental rather than a specified booster.

CONSIDER DEVELOPMENT OF A MULTI-PURPOSE LAUNCH COMPLEX
(DOD, NASA, DOT, COMMERCIAL) (VAFB)

DESCRIPTION: Vandenberg has three active medium class (3800 to 4500 LB payload) launch pads used by Delta, Atlas, and Titan vehicle for polar launches. Based on the mission model Space Launch Complexes (SLC) 2, 3, and 4 are 50% utilized through 1998. An opportunity exist to close two pads and convert the remaining pad to a medium class multi-purpose launch site. Commercial enterprises are currently using grant money to establish three commercial type medium launch pads to support the projected small and medium class spacecraft. Closing two government pads and using commercial enterprises will optimize the launch facility capability consistent with the mission model through 2023.

PAYOFF POTENTIAL: - Cost Savings

COST SUMMARY:

- Implementation cost	TBD
- O&M cost	TBD
- Anticipated net savings	TBD

PROS:
- Modernizes facility infrastructure
- Closes 2 pads and allows early shutdown of SLC-3W
- Uses Excess boosters
- Reduces risk to SLC 4E operations post 1997

CONS:
- Spacecraft developers must prepare payloads for generic launch vehicle environments
- Large upfront capital outlay

STEPS TO MAKE IT HAPPEN:
- AFMC SMC/NASA-VAFB study cost trade-offs for closing pads, converting to MVLC, and utilizing Commercial companies
- AFSPACECOM/HQ NASA realign launch manifest consistent with study

RECOMMENDATIONS: Form a joint Air Force/NASA space launch complex utilization study team to determine viability of a cost effective multi-purpose launch complex.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 2

EXPAND USE OF TITAN X-RAY FACILITY
(DOD) (VAFB)

The Titan X-ray facility is used to X-ray 60,000 lb. Titan launch segments. The facility has three x-ray cells. Each cell completes x-ray of a segment in five days for a capability of 56 segments per year. The facility is currently used to meet the mission model of two flight sets (28 segments) per year, a reduced launch schedule. Cell A and B are 25' x 35'. Cell C is 40' x 125'. The roof is removable and there is a crane to support all three cells, a control station, dark room and analyzing room. The x-ray facility is 8,910 square feet. and is rated for Class 1.1 propellant with a TNT Equivalent of 30 lbs. and has a Quantity Distance Circle of 450 square feet.

This facility will not be required for SRMU inspections. Excess capability could support various inertial stages, kick motors, and non-destruct inspection of spacecraft structures. Handling fixtures are set up for Titan segments but could handle a 12' x 60' trailer. The O&M costs for Building 946 are $19,000 for utilities, and $85,000 for contract services (refuse, ground, custodial). If x-ray services were charged to potential customers, this could help defray some of the $104,000 in O& M.

In order to use the facility, contractual obligations must be negotiated. An Air Force team of users would have to be formed by June 1994 to develop an integration plan by January 1995 to support generic launch complex multiple program activities.

See Figure PPLR-89.

EXPAND USE OF TITAN X-RAY FACILITY
(DOD) (VAFB)

DESCRIPTION: Building 946 is an 8,910 square foot facility used to x-ray Titan solid rocket segments of 60,000 lbs This facility can process elements up to a maximum size of 12' x 60'. Processing time is five days per segment and the facility is designed to process four flights sets per year (56 segments). The mission model identifies a requirement for two sets (28 segments) per year. Excess capability could support various inertial stages, kick motors, and non-destruct inspection of spacecraft structures.

PAYOFF POTENTIAL: - Cost avoidance.

COST SUMMARY:

	- Implementation Costs:	TBD
	- O&M Costs:	$104K
	- Anticipated Net Savings:	TBD

PROS: - Optimize capability.

CONS:
- Contract issues and safety concerns.
- This facility not used for SRMU's.

STEPS TO MAKE IT HAPPEN: - 30 SPW to develop joint utilization plan with user organizations.

TASK GROUP RECOMMENDATION: Expand use with other organizations requiring x-ray capabilities and defray O&M costs for this asset.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 2

CONSOLIDATE USE OF PAYLOAD TEST FACILITIES
(DOD, DOT, COMMERCIAL) (VAFB)

There are numerous facilities at Vandenberg AFB which provide payload processing of various satellites/reentry vehicles for Government programs. These payload processing facilities are designed to receive shipping, assemble on test stands, conduct mechanical/electrical checks, establish networking with command and control links, assemble mating ring and shroud, and mount on transporter for delivery to the launch complex. Each facility has its own scheduling mechanism.

Building 1559 is 21,951 square foot converted vehicle assembly building equipped with anechoic chamber, two high bays, and clean rooms. The building has two 5 ton cranes with a thirty-two foot hook height. The facility can process Class 1.1 explosives with a TNT Equivalent of 667 lbs. and has a Quantity Distance Circle of 1,250 feet. It is restricted by DMSP security concerns.

The paint booth or component labs in Building 1900 could be converted to clean rooms for small satellites. The facility is 76,000 square feet, 35' x 130' x 52'. Building 1900 can process Class 1.3 explosives up to a TNT Equivalent of 1,000 lbs. and has a Quantity Distance Circle of 2,965 feet.

Other DOD payload processing facilities include 1819, 6527, 8337, 8415, NASA programs are in buildings 1610 and 836, and two payload processing facilities are commercially operated.

Consolidation of payload processing facilities could result in substantial O&M savings if older buildings are closed and newer facilities used.

Vandenberg has modeled its payload processing facilities and requirements and concluded that there will be adequate payload processing capability for the mission model work load. A study should be conducted for possible facility consolidation. Under the 30 SPW Utilization Panel a team of Titan, Atlas, Delta, and Ballistic payload personnel should be formed to investigate the feasibility of consolidating payload processing into newer facilities by December 1994.

See Figures PPLR-90 and PPLR-91.

CONSOLIDATE USE OF PAYLOAD TEST FACILITIES
(DOD, DOT, COMMERCIAL) (VAFB)

DESCRIPTION: Building 1559, 1819, 1900, 6527, 8337 and 8415 are payload assembly building equipped with anechoic chambers, high bays, ground station rooms, and clean rooms used for DoD Space and Ballistic satellite/reentry vehicle processing. Other payload processing facilities include buildings 836 and 1610 for NASA payloads, buildings 2500 and 2520 for Titan payloads and two commercial facilities. These facilities should be studied for consolidation into fewer buildings. Payload assembly buildings including Astrotech's new facility will support the project mission model through 1998. Reduced workload after 1998 should provide vacant facilities for other usage.

PAYOFF POTENTIAL:
- Cost savings; reduced O&M.
- Cost avoidance; facility availability.

COST SUMMARY:

- Implementation Costs:	TBD
- O&M Costs:	TBD
- Anticipated Net Savings:	TBD

PROS:
- Increased use of the newer payload processing facilities.

CONS:
- Security requirements between the programs.
- 25 mile separation between north base facilities and south base launch pads.
- Modifications required for multiple program use.

STEPS TO MAKE IT HAPPEN:
- 30 SPW to work out security concerns and schedule.
- Develop consolidation plan for newer facilities and close older ones.

TASK GROUP RECOMMENDATION: Expand 30 SPW payload processing capability evaluation to include a study for consolidation of payload processing into newer facilities.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 2

CONSOLIDATE MACHINE SHOPS AT EAST AND WEST COAST RANGES
(DOD, NASA)

There are various machine shops used to support Vandenberg AFB and Cape Canaveral AFS launches. Consolidated maintenance areas consists of several work areas and shops to support Atlas, Titan, Delta, etc. These machine shops have tool cribs, tubing shops, welding shops, stock rooms, and storage used for repair and manufacture of facility support equipment necessary for DoD and NASA launches. Each contractor has a consolidated shop with similar equipment. Current work force supports single shift operations. Support function is directed more toward maintenance than facility readiness.

Consolidation of shop activities would reduce the O&M costs associated with multiple shop operations. Preliminary evaluation of the consolidation of VAFB DoD shops estimates an O&M savings of $90,000.

Contractors currently control the workload, scheduling and machine shops themselves. Contract negotiations would be required to reduce the number of machine shops. Workload scheduling would have to be either a government or independent contractor responsibility. Proposals such as a centralized shop with single shift routine crew and provision for second shift contractor augmented team during launch operations should be considered.

Independent launch service contracts would require negotiation and adjustment to joint use shops. Under the 30 SPW Utilization Panel a team of DoD and NASA personnel needs to study the options for consolidating shops and labs, realignment of contracts, establishing multiple program scheduling, and surge capability provisions by January 1995.

See Figure PPLR-92.

CONSOLIDATE MACHINE SHOPS A. EAST AND WEST COAST RANGE (DOD, NASA)

DESCRIPTION: Multiple machine shops are operated at both east and west coast locations. These shops are similar and contain tool cribs, tubing shop, welding shops, stock rooms, and storage used for repair and manufacture of facility support equipment necessary for their launch contracts. Consolidated shop operations on each coast could support all launch programs .

PAYOFF POTENTIAL:
- Cost savings; reduce O&M.
- Reduced launch service contract costs.

COST SUMMARY:

- Implementation Costs:	TBD
- O&M Costs:	TBD
- Anticipated Net Savings:	TBD

PROS:
- Reduce liability.
- Reduce the number of like operations.

CONS:
- Each program/contractor has control of priorities and workload.
- Independent launch service contracts would require negotiation/modification in order for joint use to occur.

STEPS TO MAKE IT HAPPEN:
- 45 SPW/30 SPW to develop consolidation plan.
- 45 SPW/30 SPW realign contracts.
- 45 SPW/30 SPW establish multiple program scheduling, and surge capability provisions

TASK GROUP RECOMMENDATION: 45 SPW/30 SPW/NASA panel to study the possibility of consolidating machine shops.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 2

CONSOLIDATED USE OF PAYLOAD FAIRING BUILDINGS
(DOD) (VAFB)

These buildings are used for fairing processing for the Atlas and Titan programs. They provide painting, cleaning, and processing of Titan missile fairings (Bldg. 8337 cell dimensions - 39'x85'x40") and Atlas missile fairings (Bldg. 766 cell dimensions - 20' x 35' x 20'). The facilities house similar equipment and capability at either Building 8337 or 776. Current mission model suggests each facility will be 50% utilized. The Atlas II program projects full processing capability for one shift operations by FY97. Titan processes two fairings per year. Building 8337 has two high bays with clean rooms and two dry filter paint booths. Building 766 is approved for Class 1.3 explosives with a TNT Equivalent of 1,000 lbs. and a Quantity Distance Circle of 3,166 square feet. Other launch processing operations in Building 766 prevent optimizing fairing processing. Building 8337 is not approved for explosives and is 62,703 square feet.

Current O&M costs are $204,000. This includes $11,000 in utilities, $5,000 in contract services (refuse, grounds, custodial) and $1,000 in planned repairs for Building 766 and $98,000 in utilities, $84,000 in contract services, and $5,000 in planned maintenance for Building 8337. The $17,000 spent to maintain Building 766 could be saved if Building 8337 could be used to process the Atlas fairing.

Consolidation will make better use of the facilities and would reduce the required government oversight manning. Security issues would have to be worked to process different payloads with security restrictions. Robotics automation and multiple size fairing support equipment will require study to assess feasibility and cost savings.

Evaluate the potential of centralizing capabilities, develop joint use contracts, and construct scheduling system for maximizing payload fairing preparation, cleaning, and flight readiness. Under the 30 SPW Utilization Panel develop an Air Force Atlas/Titan team to develop a feasibility recommendation for combining these operations by January 1995.

See Figure PPLR-93.

CONSOLIDATED USE OF PAYLOAD FAIRING BUILDINGS
(DOD) (VAFB)

DESCRIPTION: The Titan fairing building (8337) is 62,703 square feet and provides painting, cleaning, and processing of Titan missile fairings. The Atlas missile fairing building (766) is 3,166 square feet. Current mission model indicates each facility will be 50% utilized. Both facilities house similar equipment and perform similar functions that could be consolidated.

PAYOFF POTENTIAL: - Cost savings.

COST SUMMARY:

- Implementation Costs: TBD
- O&M Costs: $204K
- Anticipated Net Savings: TBD

PROS:

- Better use of facility space and some processing equipment.
- Consolidated fairing operations would reduce government oversight manning requirement.

CONS:

- Multiple contractors in the same facility could result in security and proprietary data concerns.

STEPS TO MAKE IT HAPPEN:

- 30 SPW to evaluate the potential of centralizing fairing shop capabilities.
- 30 SPW to develop joint use plan, contracts and scheduling system for payload fairing preparation, cleaning, and flight readiness.
- 30 SPW to resolve security concerns.

TASK GROUP RECOMMENDATION: 30 SPW panel to establish joint team to develop consolidation cost trade offs.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 2

CONSOLIDATE BOOSTER SUPPORT, HAZARDOUS WASTE, ORDNANCE, AND FLAMMABLE STORAGE

(DOD) (VAFB)

These facilities are used to store equipment, ordnance, hazardous waste, or flammables for Atlas, Titan, and Peacekeeper programs. Some facilities are not effectively used due to program changes. Currently utilization of Atlas buildings 773, 776 & 789 is 25% but will increase as the Atlas II program becomes operational at Vandenberg. The mission model indicates the end of the Peacekeeper program in FY97. Building 1836, 1895, and 8418 requirements should be reduced providing space for other programs. Building 720 is 8,900 square feet that is used for is hazardous waste storage. It was previously used for live end item storage at SLC-4. The facility could be turned into an enclosed storage facility located on SLC-4. Bldg. 7414 is used for flammable storage and is rarely used by the Titan program. Several buildings are used to store ordnance for various programs. Facilities are located throughout Vandenberg AFB and are used to store Class 1.1, 1.2, 1.3, and 1.4 1,000 lb. ordnance that is used by Titan, Atlas, Delta, Minuteman and Peacekeeper launch programs. Storage of ordnance could be consolidated and vacate and abandon marginal ordnance storage facilities.

Consolidation of equipment, ordnance, and fuels storage could free up numerous facilities which will save the O&M costs and Government oversight of those facilities. Total O&M for these facilities is $400,000.

Under the 30 SPW Utilization Panel a team of Titan, Atlas, Delta, Ballistic, and base environmental facilities experts be formed to develop a feasibility consolidation recommendation by January 1995.

See Figures PPLR-94 and PPLR-95.

CONSOLIDATE BOOSTER SUPPORT, HAZARDOUS WASTE, ORDNANCE, AND FLAMMABLE STORAGE
(DOD, NASA) (VAFB)

DESCRIPTION: There are numerous buildings at Vandenberg AFB which are used for storage of equipment, hazardous waste, ordnance, and flammable storage. Equipment used for launch support is stored in various locations. Ordnance facilities located throughout Vandenberg AFB are used to store Class 1.1, 1.2, 1.3, and 1.4 1,000 lb. ordnance that is used by the Titan, Atlas, Delta, Minuteman, and Peacekeeper launch programs. Storage of ordnance could be consolidated and unused ordnance storage facilities abandoned. Centralizing hazardous waste and flammables will minimize safety and environmental concerns.

PAYLOAD POTENTIAL: - Cost avoidance.

COST SUMMARY:

- Implementation Costs:	TBD
- O&M Costs:	$400K
- Anticipated Net Savings:	TBD

PROS:
- Centralized control and facility optimization.
- O&M and government oversight reduced.

CONS:
- Program security consideration.
- Multiple contractors responsible for the equipment/storage, waste, and ordnance.

STEPS TO MAKE IT HAPPEN:
- 30 SPW to resolve joint utilization issues.
- Develop consolidation plan and reassign available buildings.

TASK GROUP RECOMMENDATION: Study consolidating equipment, waste/flammable, and ordnance into fewer facilities.

DATE: 11/18/93 **REV:** 1/13/94 **CATEGORY:** 2

MODIFY SLC 36A FOR COMMERCIAL ATLAS LAUNCHES

(AIR FORCE/GENERAL DYNAMICS/DOT) (CCAFS)

Space Launch Complex (SLC) 36A is one of two launch pads used to launch Atlas launch vehicles. The other pad is SLC 36B. Both pads contain a mobile service tower and launch umbilical tower and are served by a common blockhouse where the launch control function is performed.

SLC 36A is currently used exclusively for the launch of DoD payloads and is configured to launch the Atlas II version. Commercial Atlas IIA launches will also be accommodated at SLC 36A in the future. All commercial Atlas launches are presently launched from SLC 36B. SLC 36B is assigned to General Dynamics(GD) and has been modified at their own expense to accommodate all versions of the Atlas launch vehicle (I, II, IIA, IIAS). GD also pays the full O&M costs associated with SLC 36B. DoD pays for the O&M costs on SLC 36A and the common blockhouse (GD pays for any mission related direct costs when using the blockhouse for commercial launches).

The mission model shows 40 Atlas II launches from SLC 36A through the year 2023; approximately 90% of the time the launch rate for 36A ranges from 0 to 2 launches per year (increasing to 3 or 4 launches for the remaining years). By contrast, for this same period, the mission model shows 120 commercial Atlas launches from SLC 36B; approximately 23% of the time the launch rate for 36B ranges from 0 to 2 launches (52 % of the time it ranges from 3 to 4 launches; 16 % of the time it ranges from 5 to 6 launches; 9 % of the time it ranges from 8 to 10 launches).

Since the projected launch activity for commercial Atlas launches is approximately 3 times greater than the number of DoD launches projected from 1993 to 2023 it makes sense to use SLC 36A as a launch asset in addition to SLC 36B. This would require GD to invest corporate funds to modify SLC 36A to make it compatible with all commercial Atlas launch vehicle configurations since SLC 36A can only support the Atlas II configuration. This approach would give GD greater flexibility and capability in support of the commercial launch program.

See Figure PPLR-97.

FILE: SLC36A1

MODIFY SLC 36A FOR COMMERCIAL ATLAS LAUNCHES

(AIR FORCE/GENERAL DYNAMICS/DOT) (CCAFS)

DESCRIPTION: Space Launch Complex (SLC) 36A is currently used to launch DoD payloads using the Atlas II. Commercial Atlas IIA launches will be accommodated in the future but presently are not (SLC 36B is used exclusively for commercial Atlas launches). SLC 36A cannot support the commercial Atlas I or IIAS configurations. The commercial Atlas operator, General Dynamics, could be permitted to modify SLC 36A to support all Atlas configurations. This would give the commercial Atlas program greater flexibility and overall launch opportunities.

PAYOFF POTENTIAL: - Increased commercial launch capability.

COST SUMMARY:
- Implementation costs: None to DoD/NASA.
- O&M costs: TBD
- Anticipated net savings: None to DoD/NASA.

PROS: - Allow all Atlas configurations to be launched from both pads 36A and 36B.

CONS: - Initial commercial capital investment.

STEPS TO MAKE IT HAPPEN:
- Joint study by Air Force and General Dynamics to evaluate feasibility of modifying SLC 36A to support all commercial Atlas configurations.
- Team to develop recommendations.

TASK GROUP RECOMMENDATION: 45 SPW initiate study with General Dynamics.

DATE: 12/06/93 **REV:**1/13/94 **CAT:** 2

FILE: SLC36A

FACILITIES TO SUPPORT SINGLE-STAGE-T0-ORBIT (SSTO) PROGRAM
(NASA/AF)

The Launch Complex-39 area contains two launch pads, currently used for NASA Space Transportation System (STS) operations. Additional facilities consist of a multi-bay Vehicle Assembly Building (VAB), an adjoining Launch Control Center (LCC) containing four firing rooms, three Orbiter Processing Facilities, and a Shuttle Landing Facility.

If the final architecture chosen for the single-stage-to-orbit (SSTO) program is a vertical take-off/horizontal landing (VTHL) vehicle, the two LC-39 launch pads would be modified in a serial manner so as to permit an orderly transition from STS to SSTO. Flight rate (currently forecast at 39 SSTO flights/year) and turnaround time will determine the necessity of modifying both launch pads. If the architecture chosen is a horizontal takeoff/horizontal landing (HTHL) vehicle, no requirement will exist to utilize the STS launch pads for SSTO. In either event, new facilities consisting of a safing, servicing, and deservicing facility, and a new multi-bay SSTO horizontal processing facility will be required. Additionally, the existing Shuttle Landing Facility would be used for either option.

ACILITIES TO SUPPORT SINGLE-STAGE-T0-ORBIT (SSTO) PROGRA...
(NASA/AF)

DESCRIPTION: Modifications to existing Shuttle launch pad(s) if SSTO vehicle takes off vertically. New safing, servicing, and deservicing facility. New multi-bay SSTO horizontal processing facility.

PAYOFF POTENTIAL:
- Increased commercial launch capability.
- Reduced O&M costs (approximately 50% of STS).

COST SUMMARY:
- Implementation costs: TBD.
- O&M costs: TBD.

PROS:
- Reduced O&M costs.

CONS:
- Initial capital investment.
- Moderate- to high-risk technology development program required.

STEPS TO MAKE IT HAPPEN:
- Joint DoD/NASA program to develop technology/vehicle to support national space launch needs.

TASK GROUP RECOMMENDATION: NASA/AF pursue program opportunities.

DATE: 1/18/94 **REV:** **CAT:** 2

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY

WORKING GROUP

CAT 2

FACILITY PHOTOGRAPHS

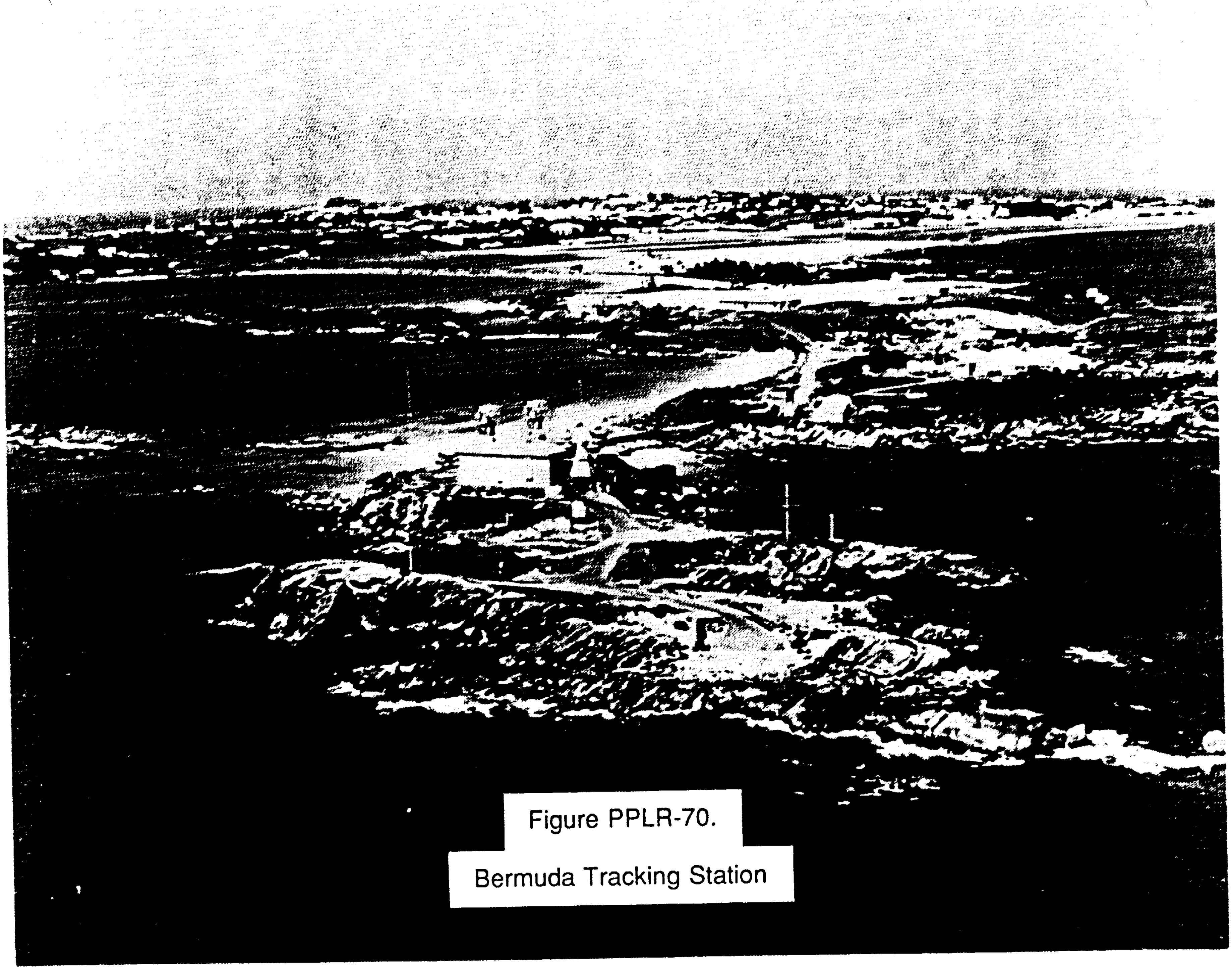


Figure PPLR-70.

Bermuda Tracking Station

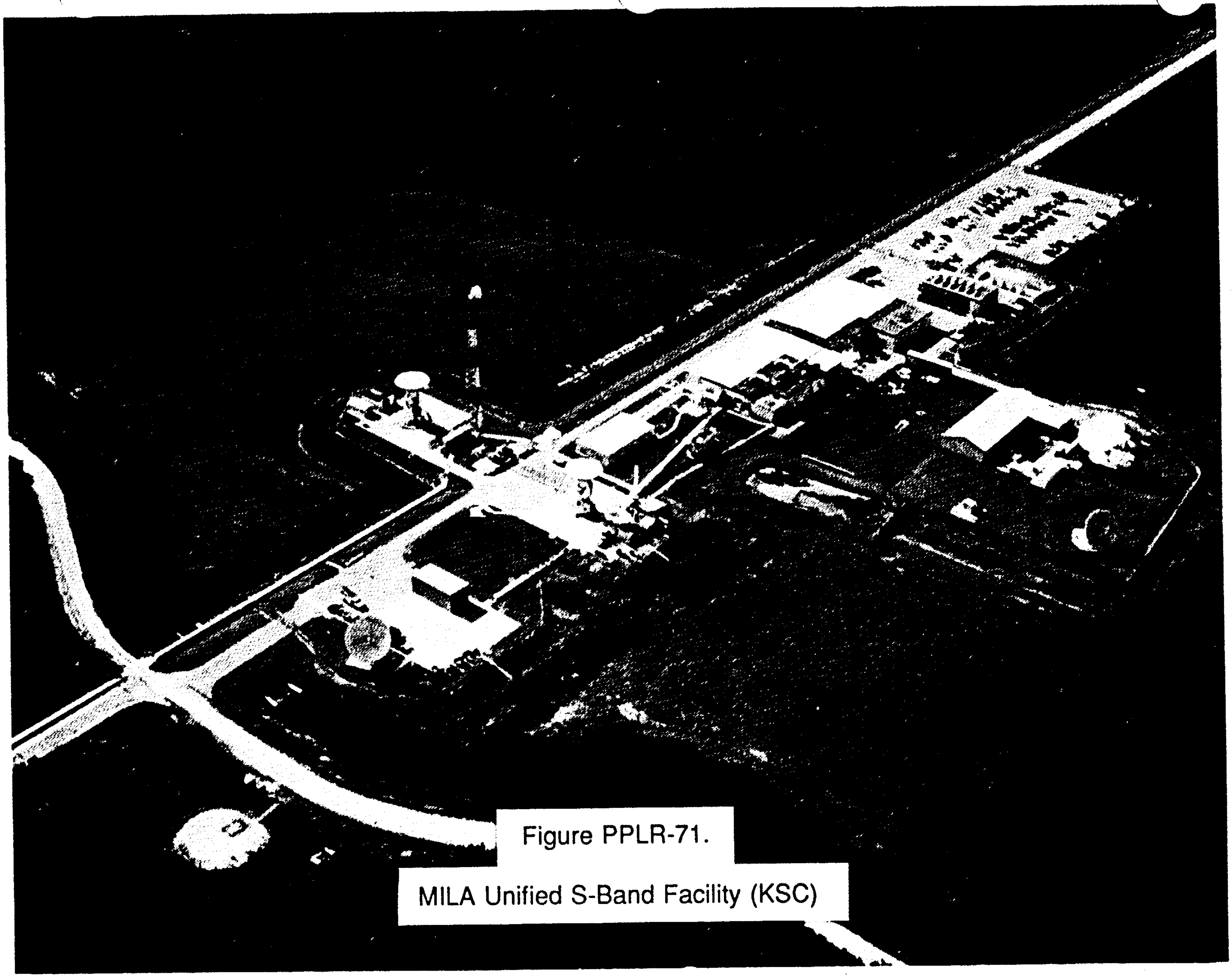


Figure PPLR-71.

MILA Unified S-Band Facility (KSC)

Figure PPLR-72.

NASA Shuttle Logistics Depot (NSLD) (KSC)

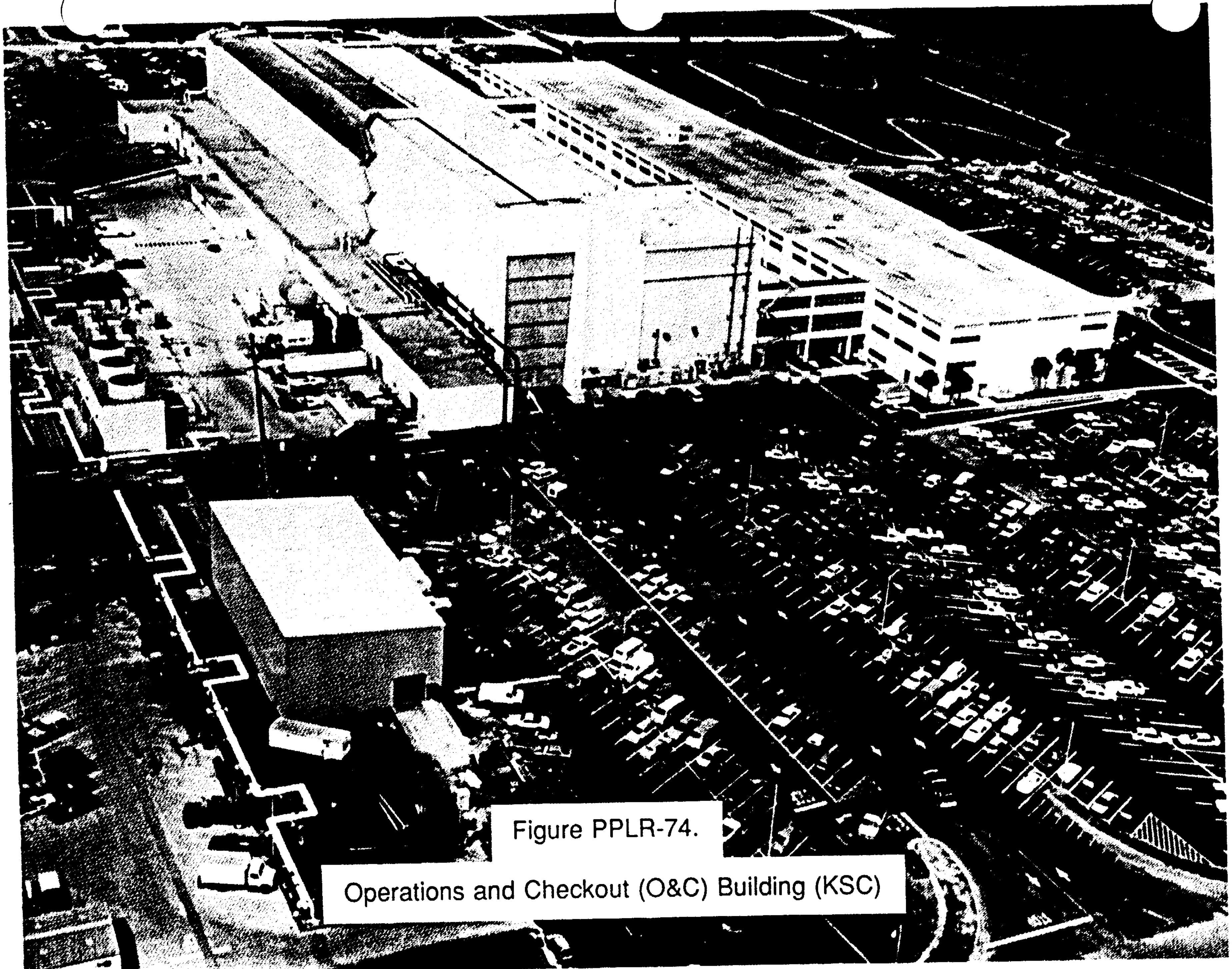


Figure PPLR-74.

Operations and Checkout (O&C) Building (KSC)

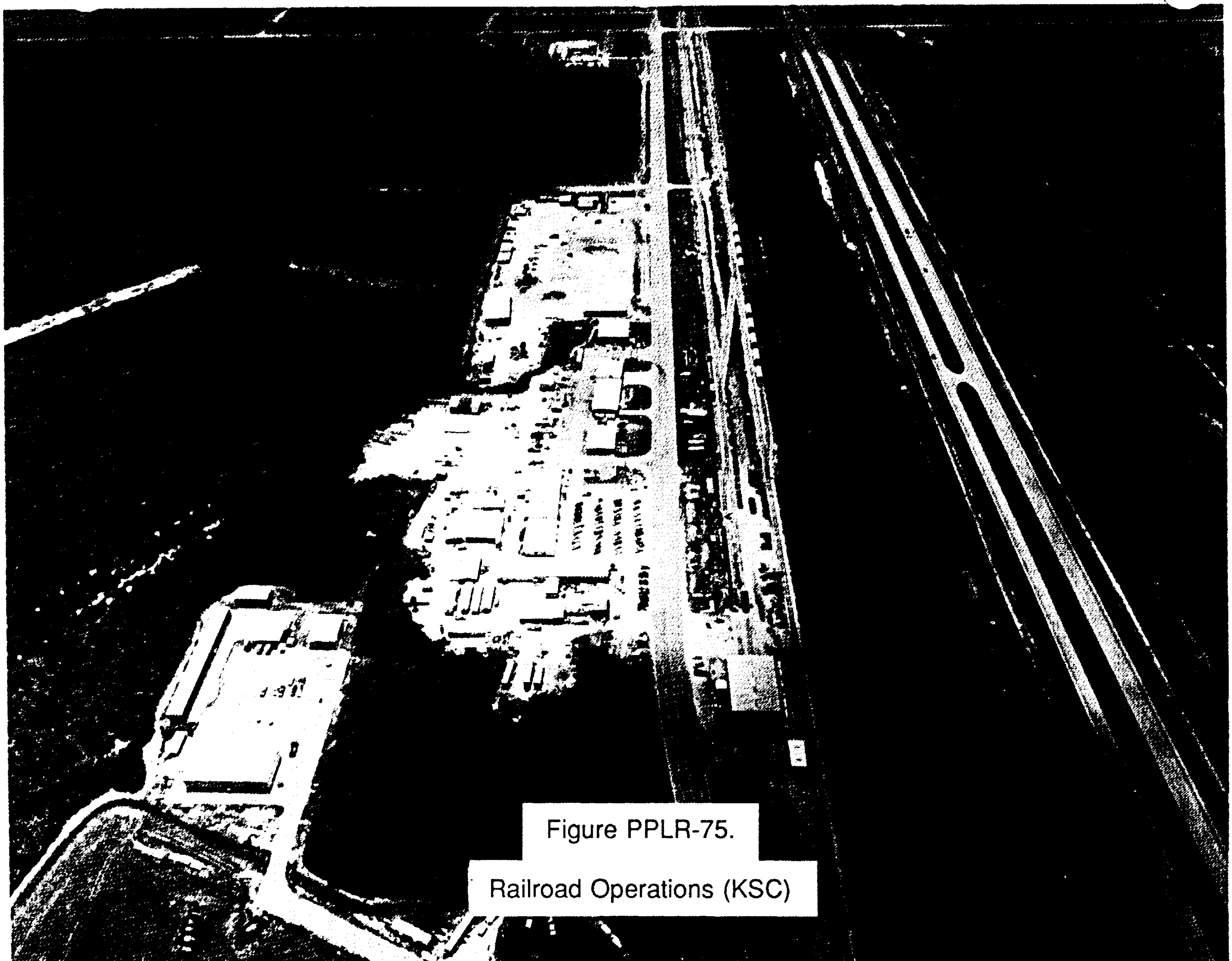


Figure PPLR-75.

Railroad Operations (KSC)

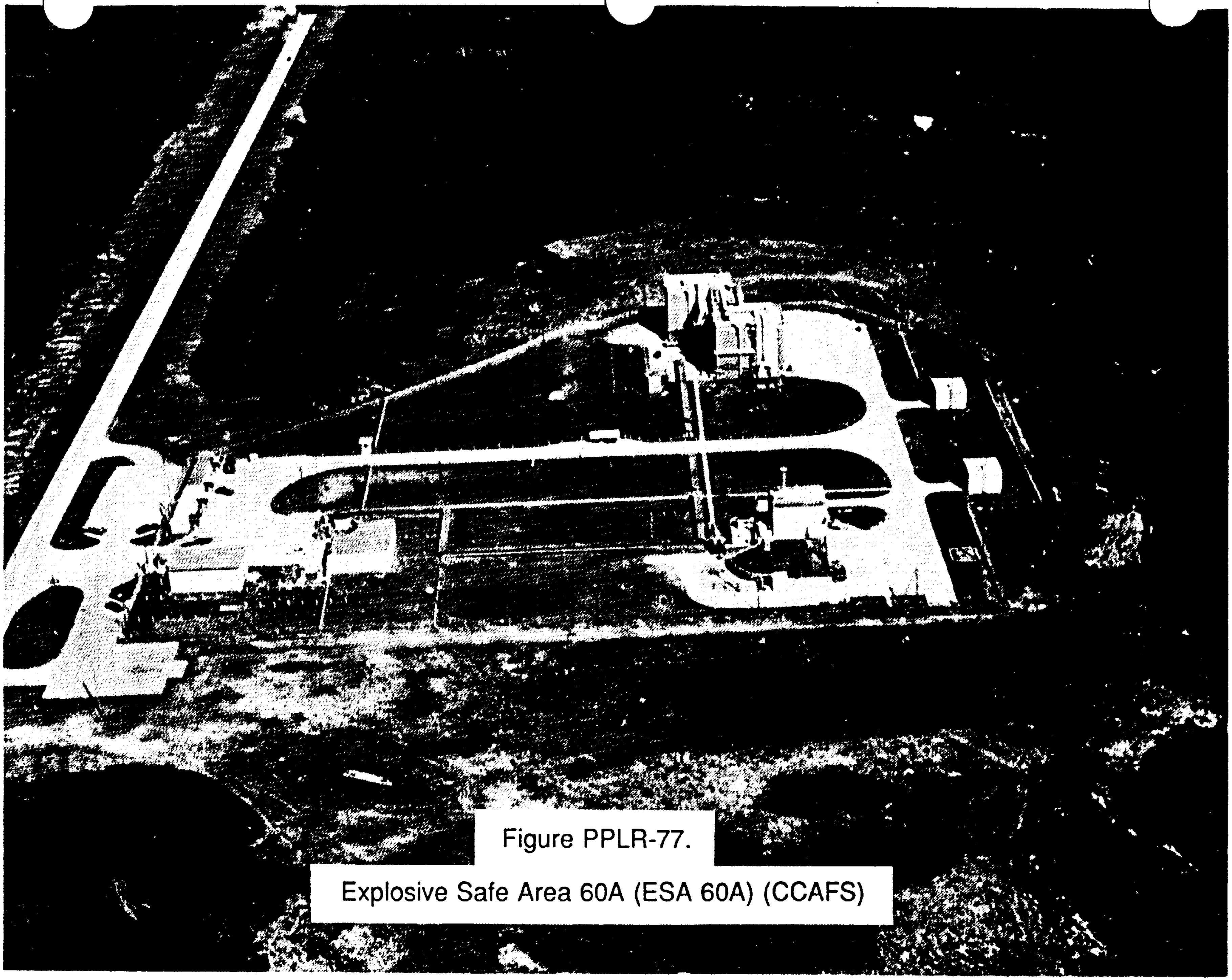


Figure PPLR-77.

Explosive Safe Area 60A (ESA 60A) (CCAFS)

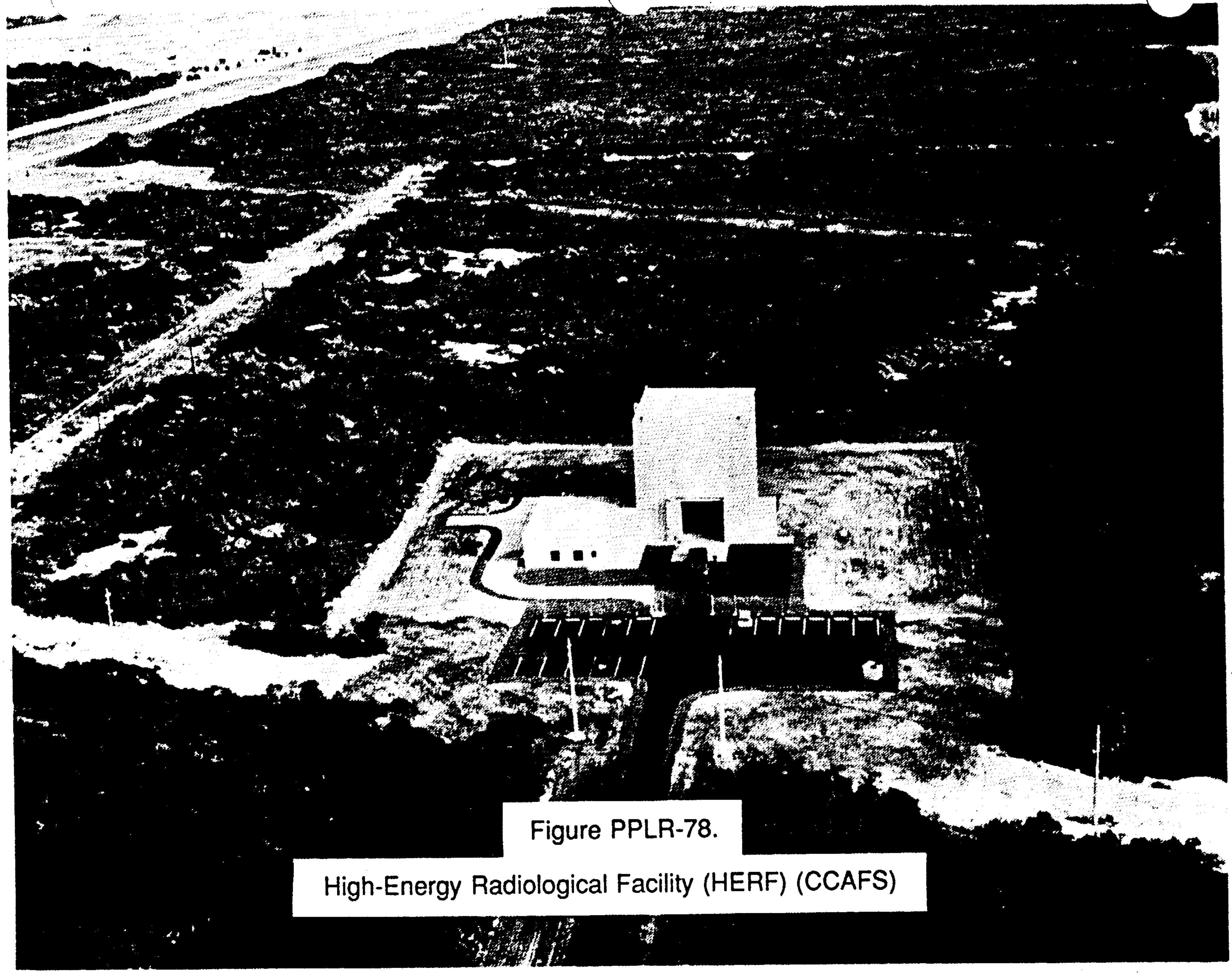


Figure PPLR-78.

High-Energy Radiological Facility (HERF) (CCAFS)

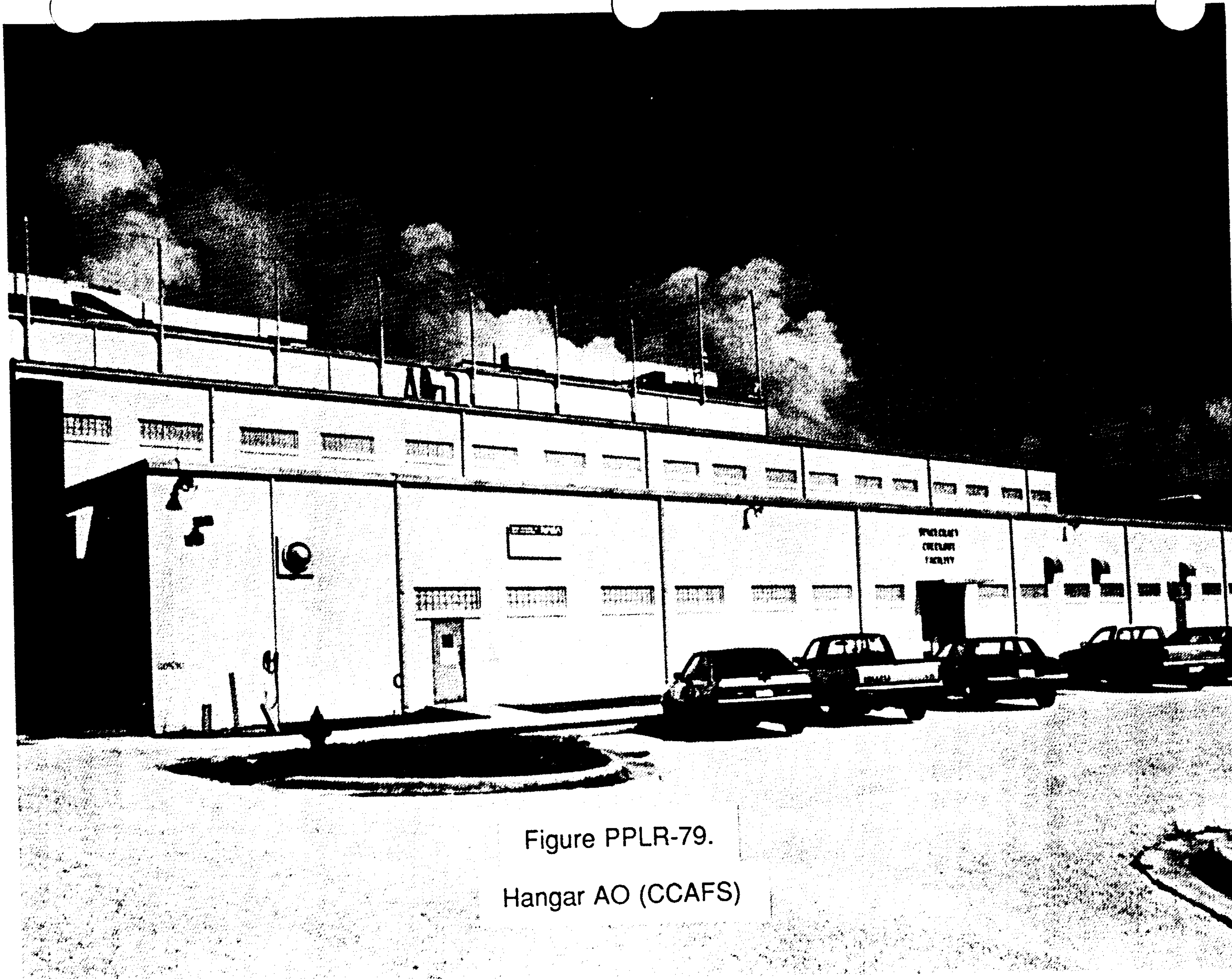


Figure PPLR-79.

Hangar AO (CCAFS)

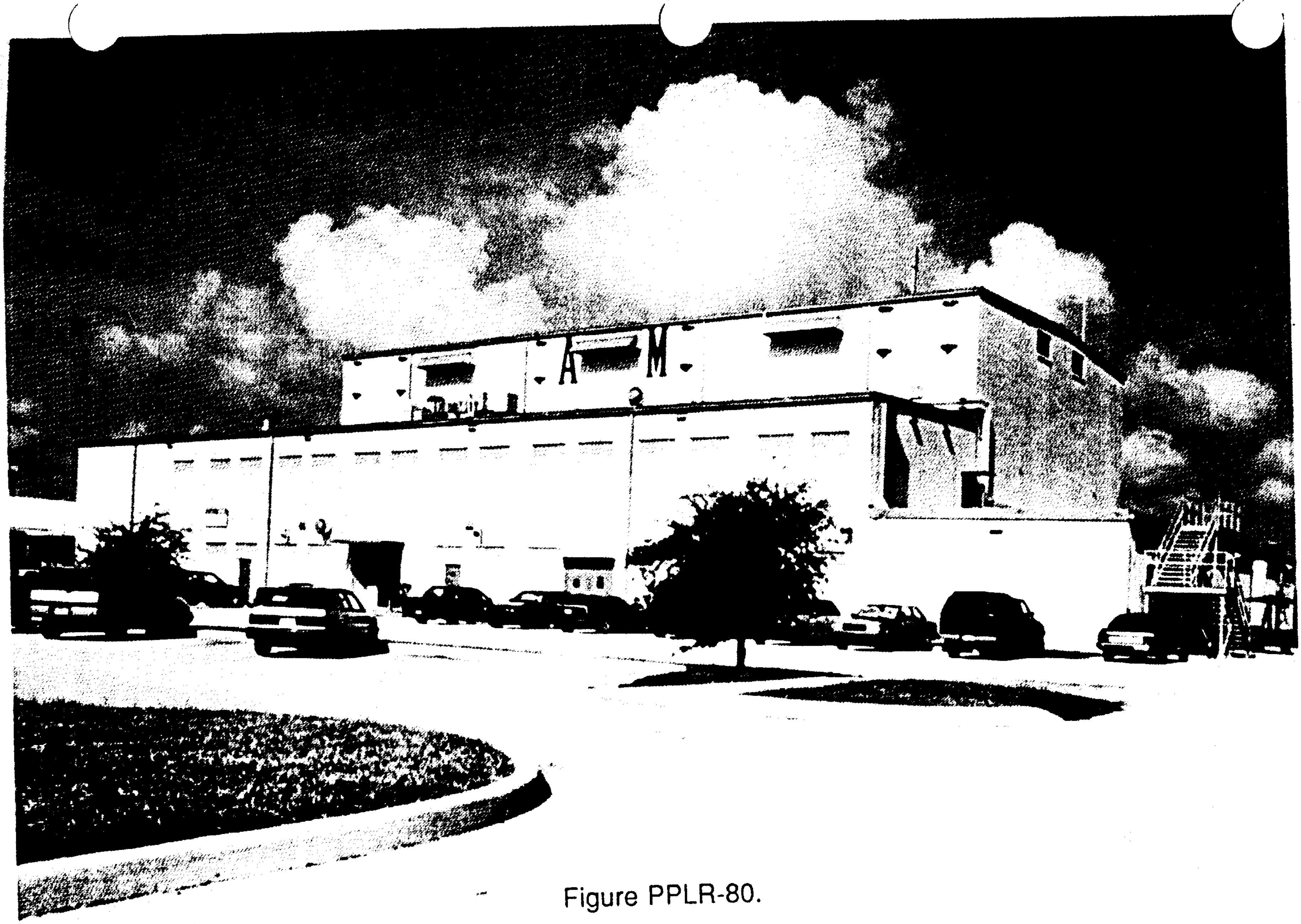


Figure PPLR-80.

Hangar AM (CCAFS)

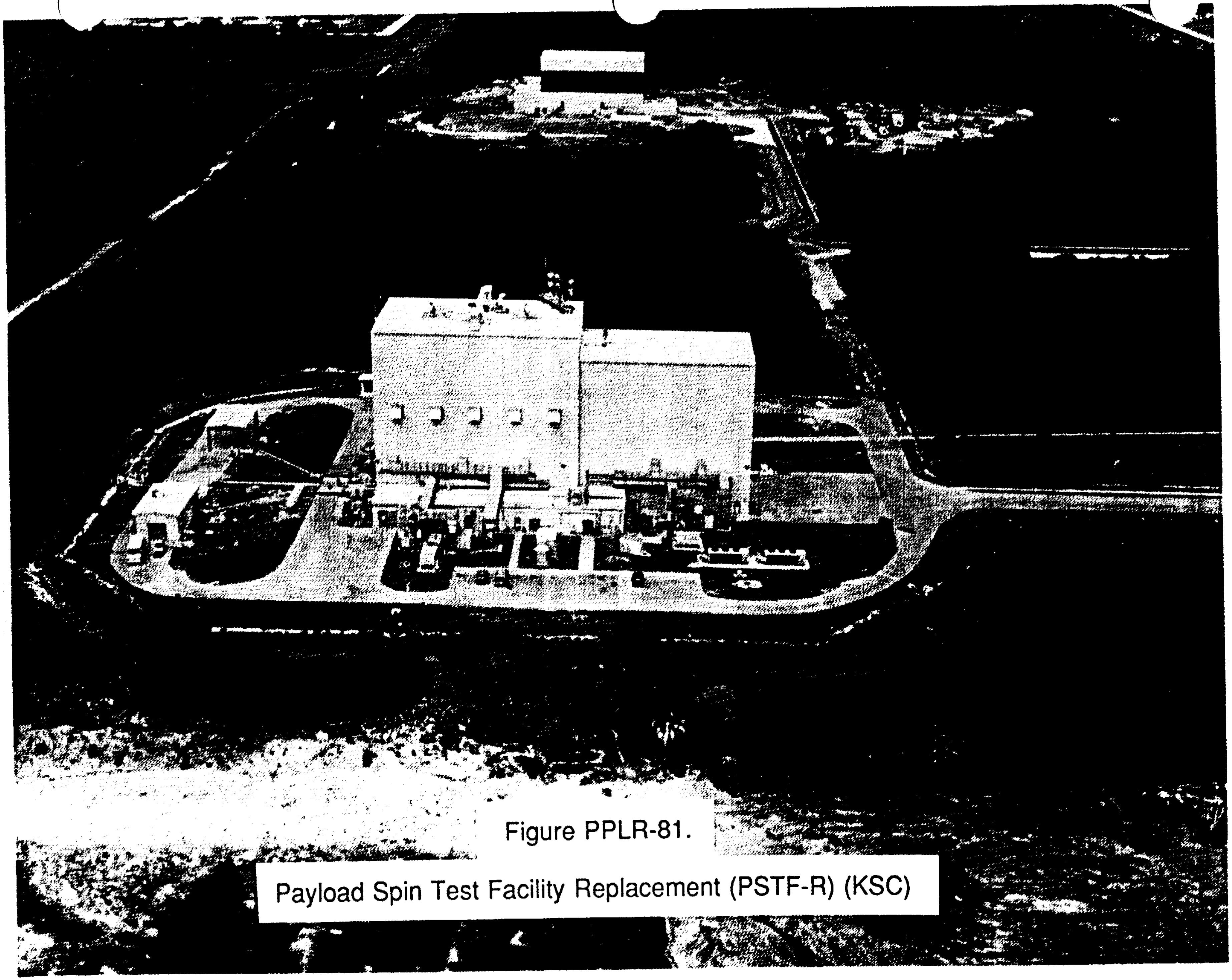


Figure PPLR-81.

Payload Spin Test Facility Replacement (PSTF-R) (KSC)

Figure PPLR-82.

Launch Operations Control Center (LOCC) (CCAFS)

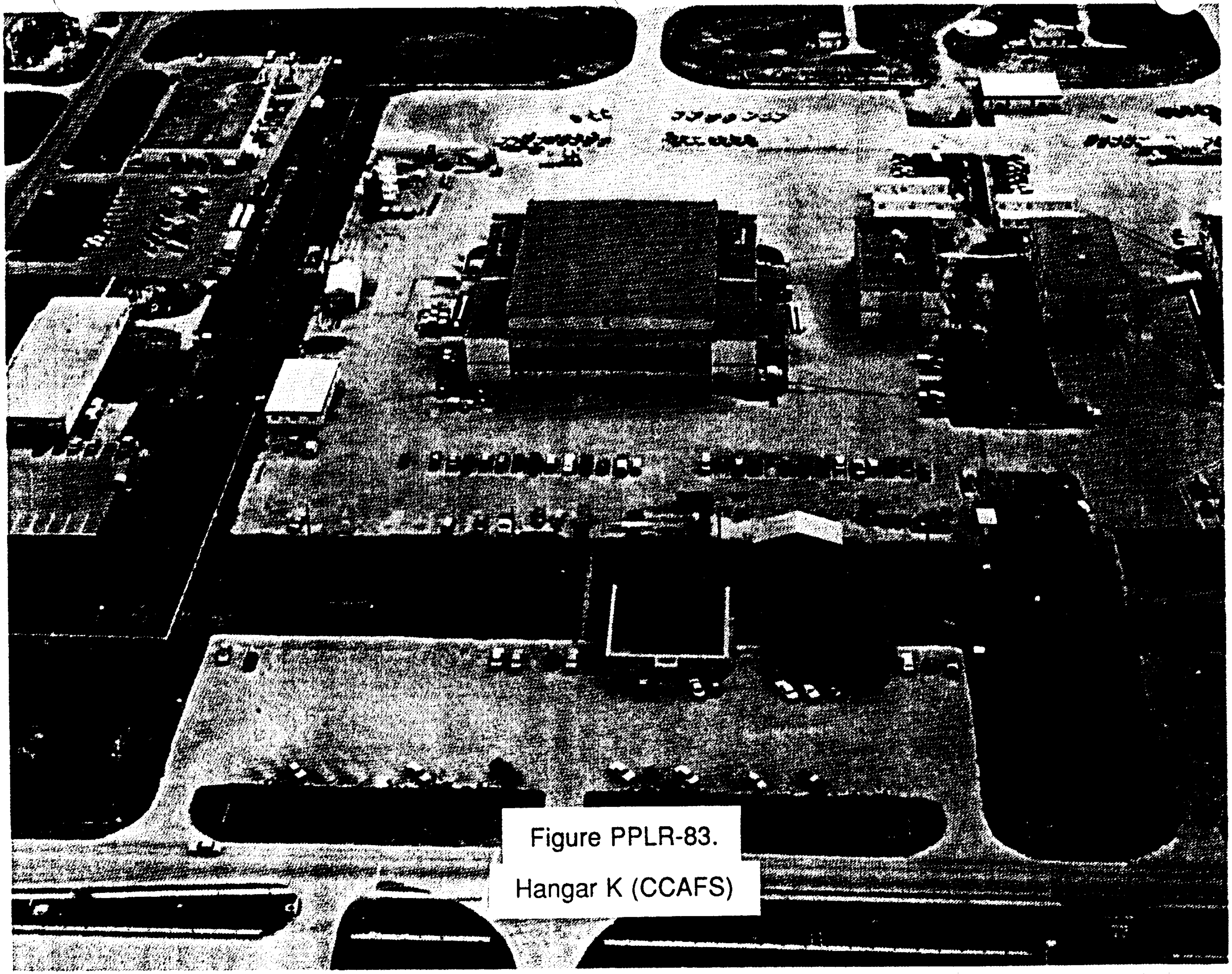


Figure PPLR-83.
Hangar K (CCAFS)

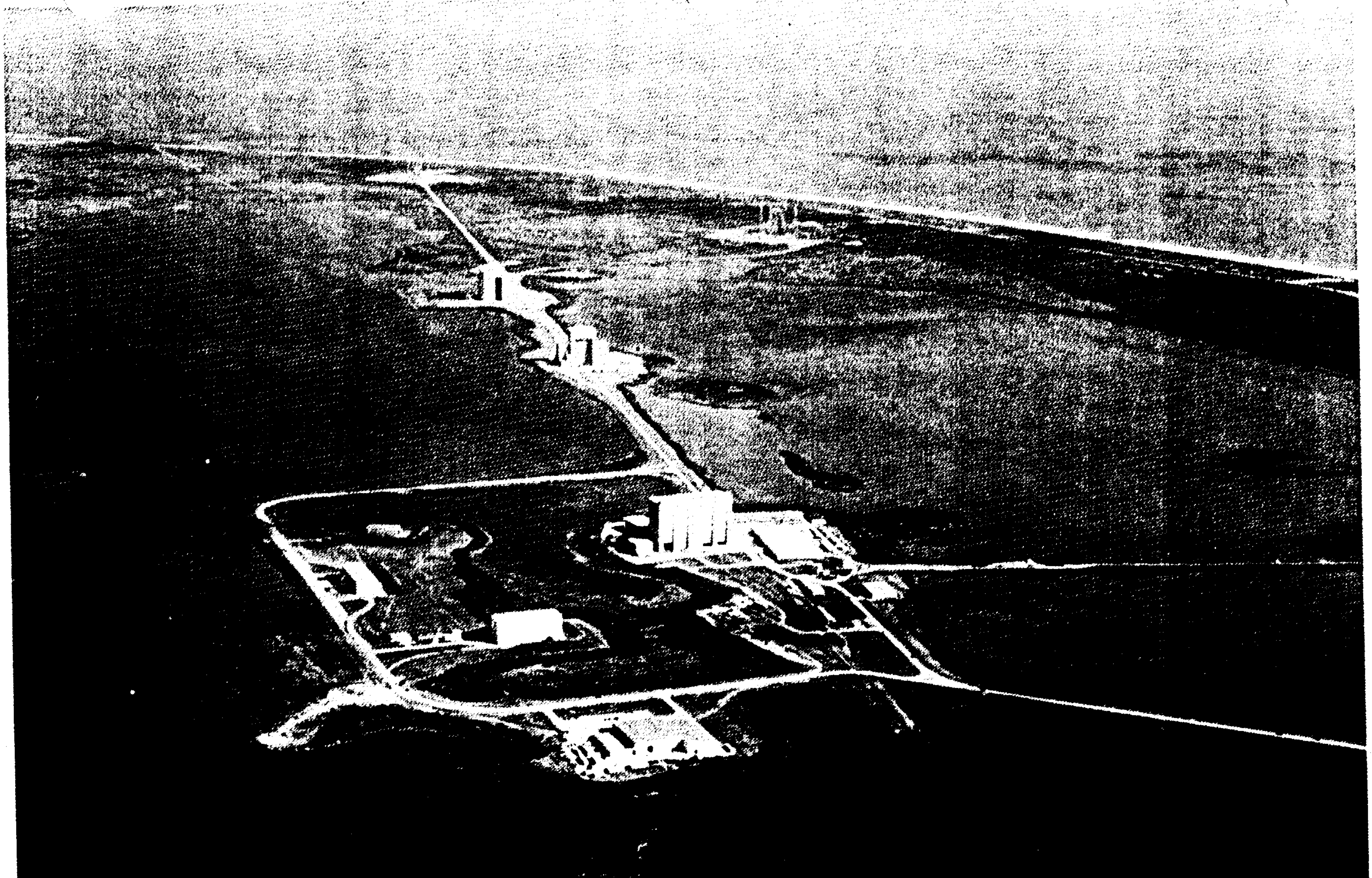


Figure PPLR-87.

Titan Integrate - Transfer - Launch (ITL) Area (CCAFS)

Figure PPLR-88.

Skid Strip (CCAFS)

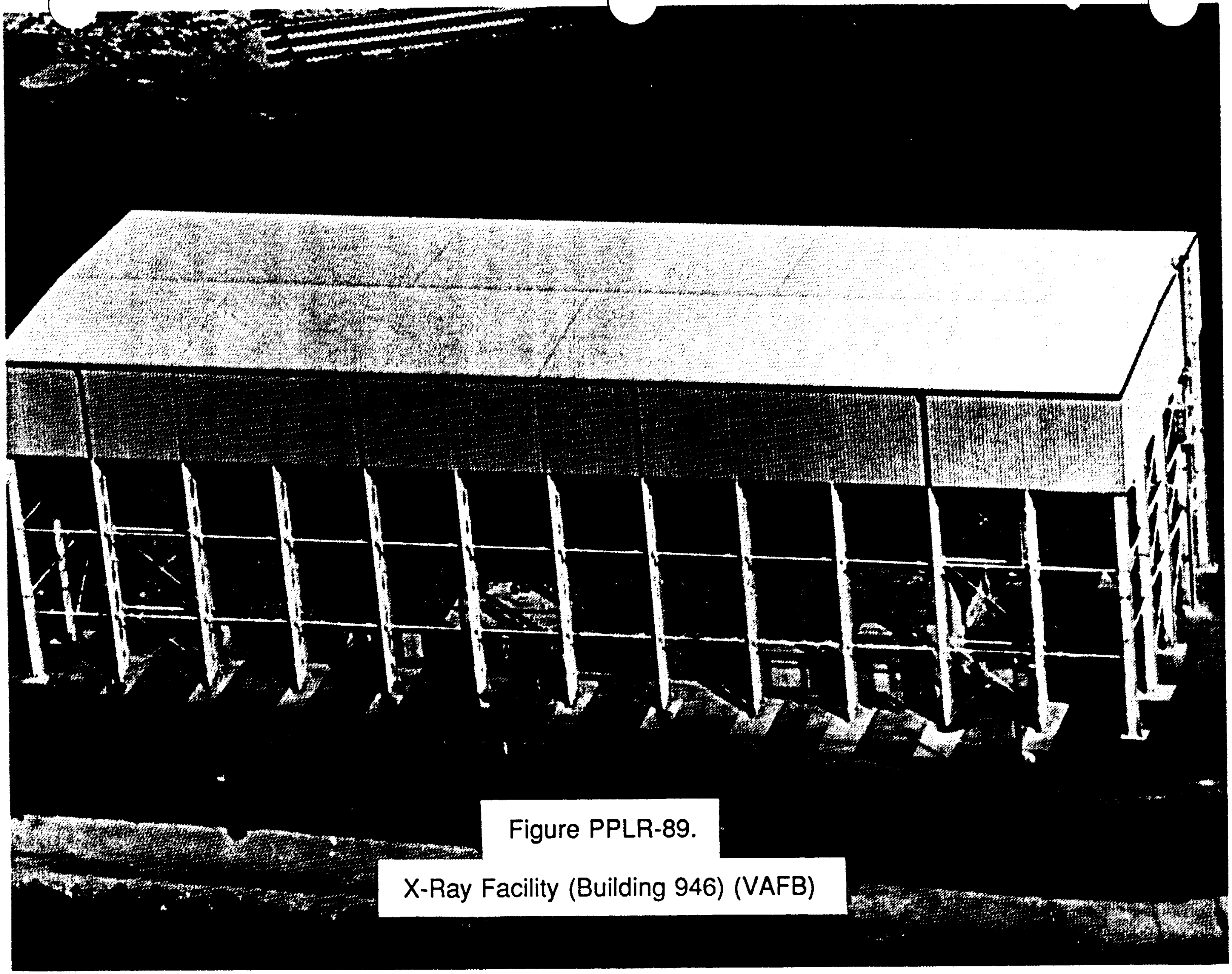


Figure PPLR-89.

X-Ray Facility (Building 946) (VAFB)

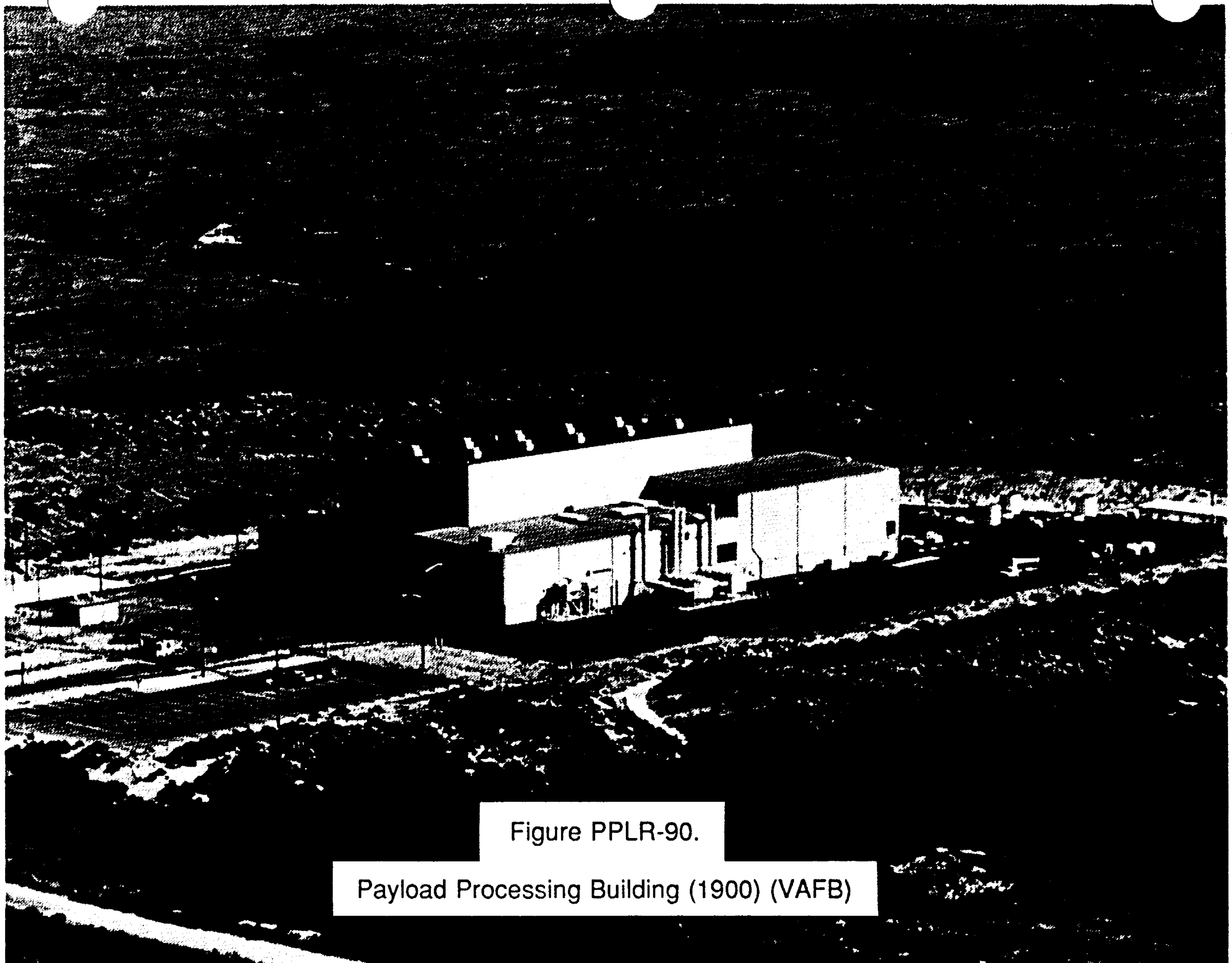


Figure PPLR-90.

Payload Processing Building (1900) (VAFB)

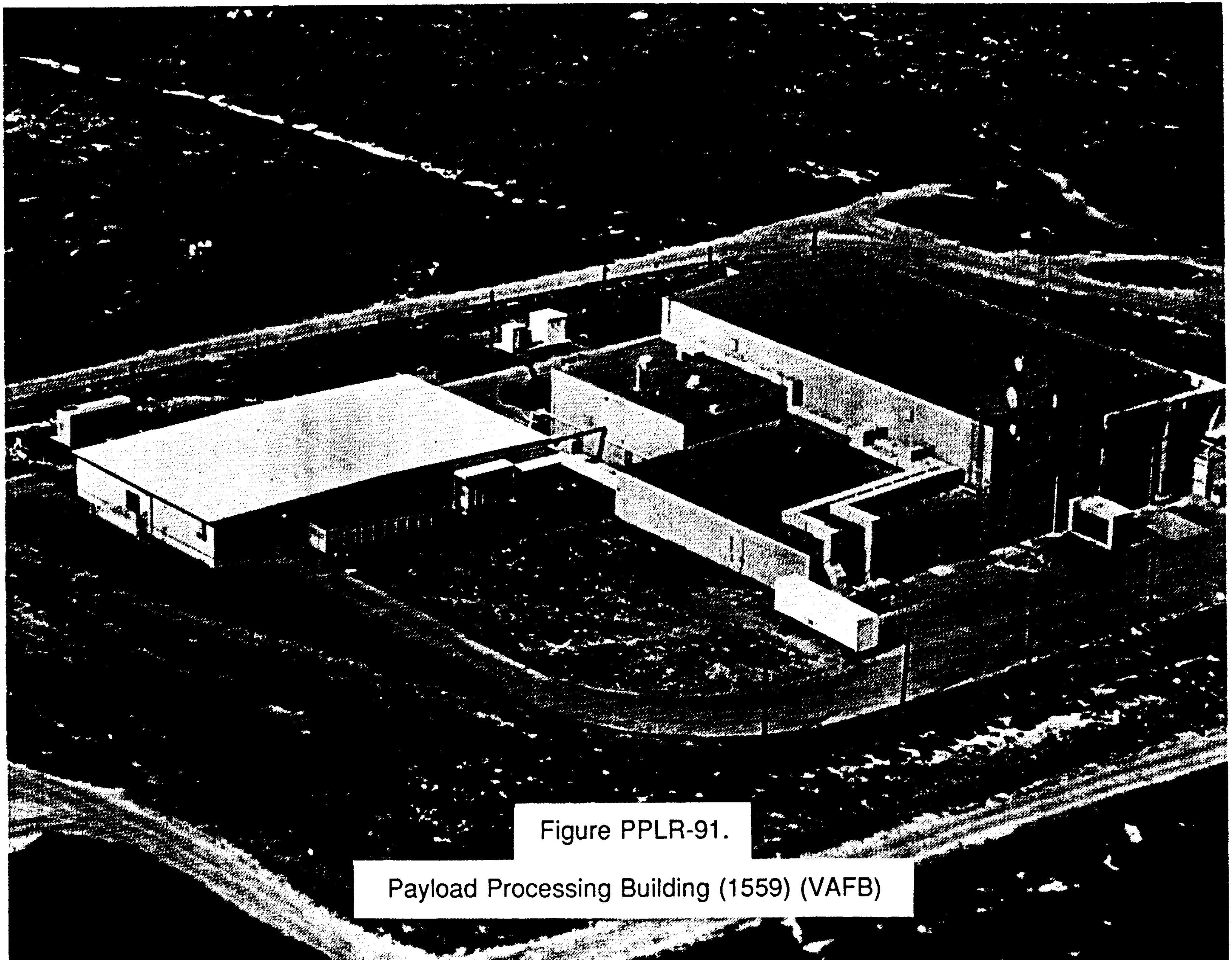


Figure PPLR-91.

Payload Processing Building (1559) (VAFB)

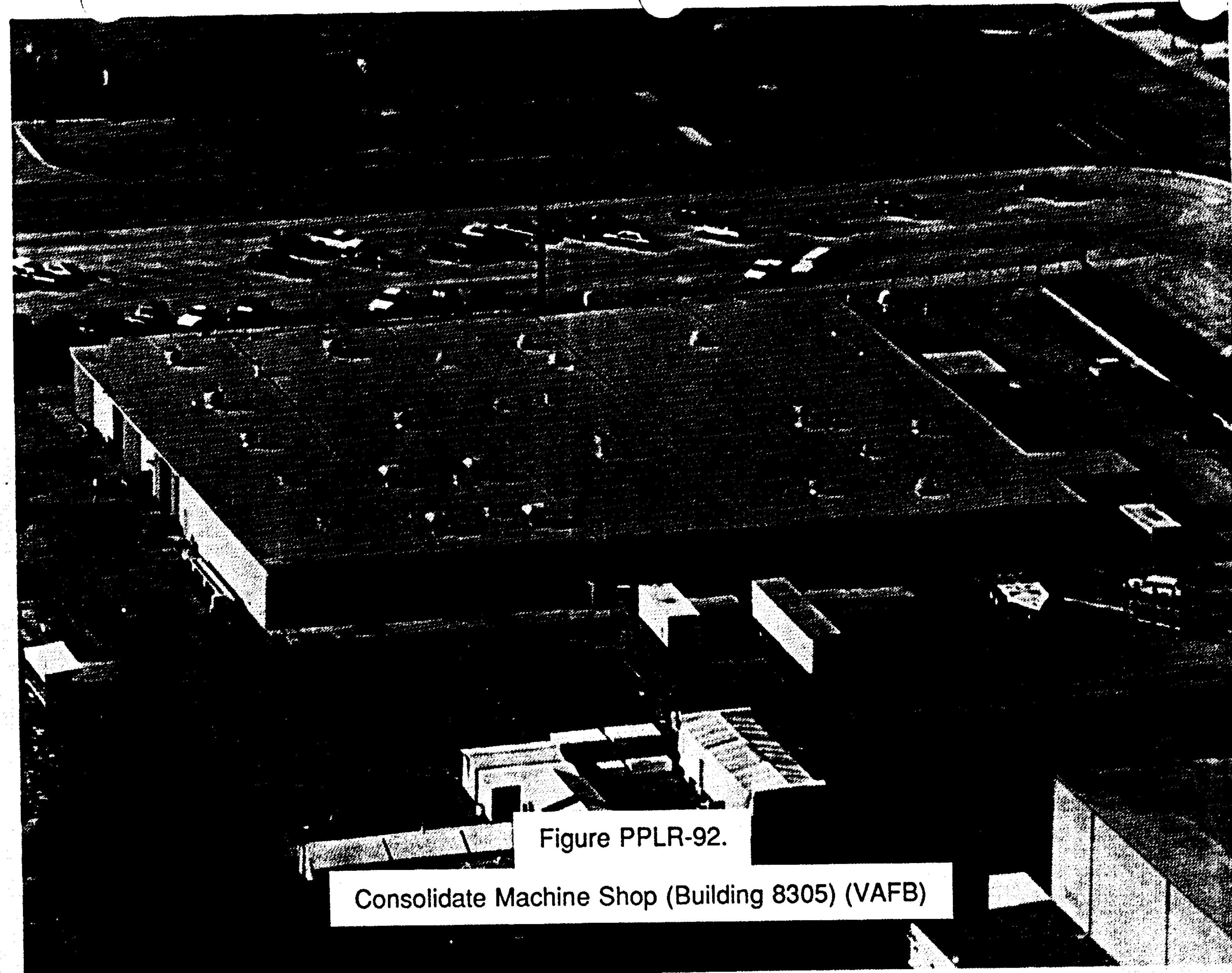


Figure PPLR-92.

Consolidate Machine Shop (Building 8305) (VAFB)

Figure PPLR-93.

Payload Fairing Building (8337) (VAFB)

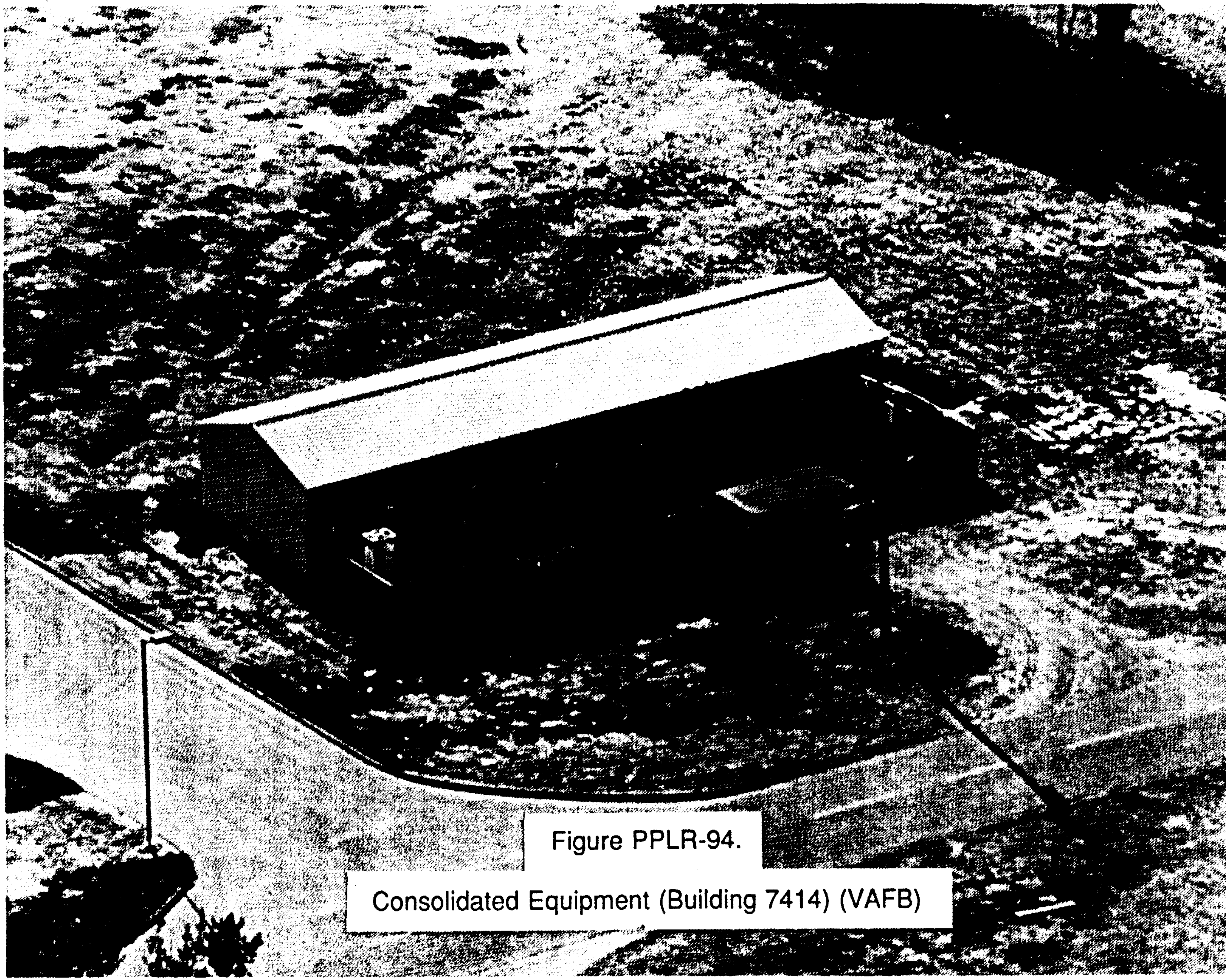


Figure PPLR-94.

Consolidated Equipment (Building 7414) (VAFB)

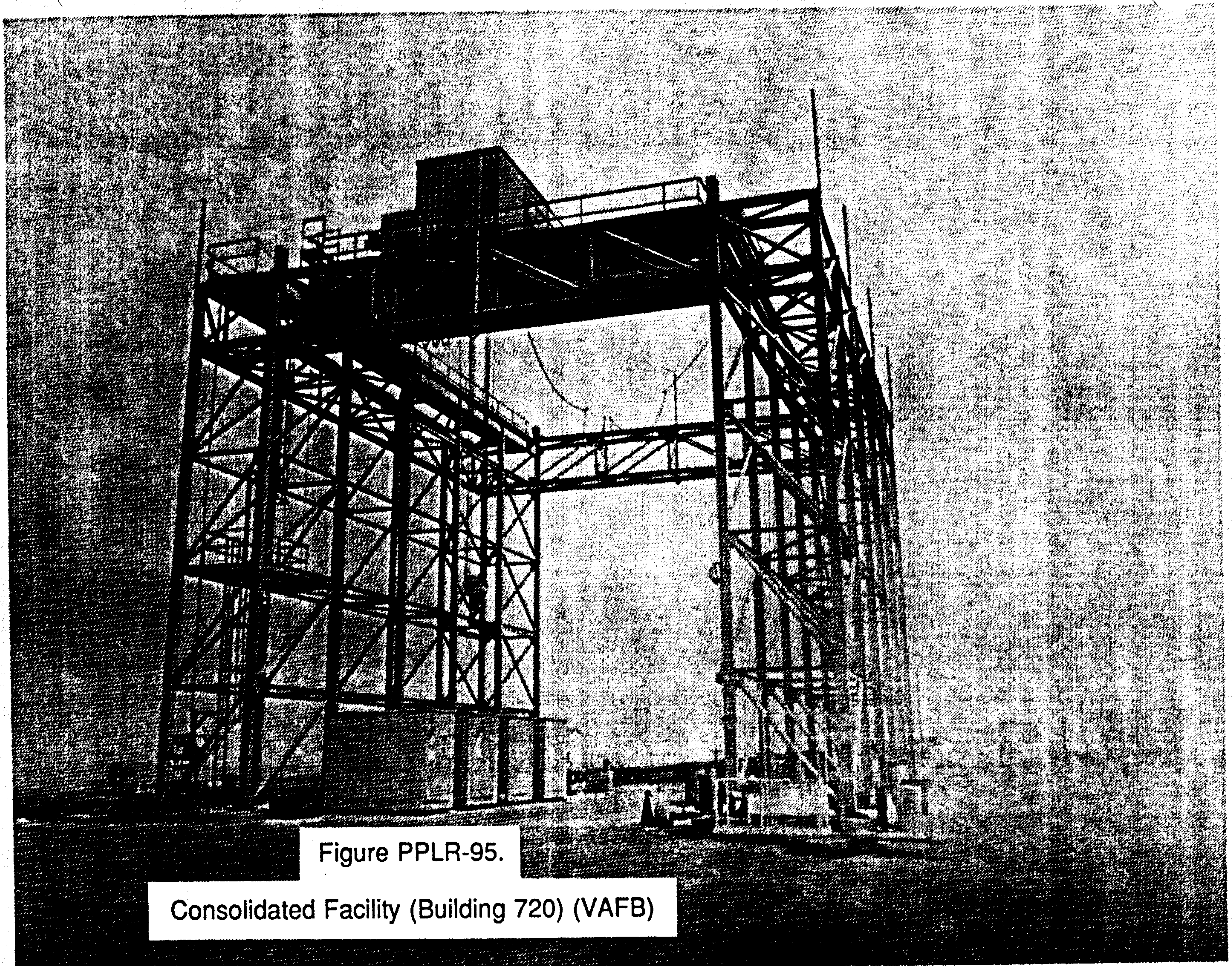


Figure PPLR-95.

Consolidated Facility (Building 720) (VAFB)

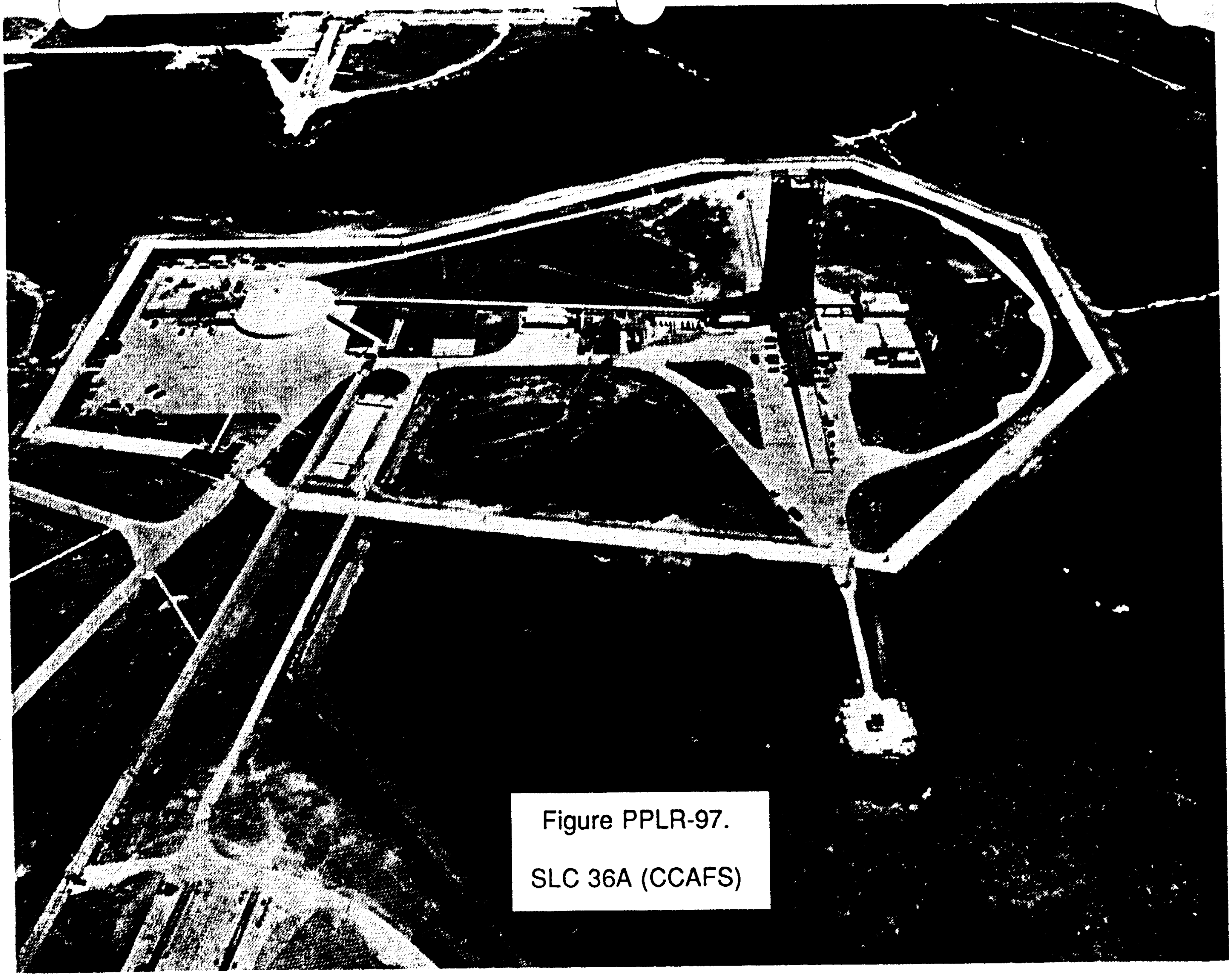


Figure PPLR-97.

SLC 36A (CCAFS)

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

CATEGORY 3's

The following list of facilities represents those facilities where the team makes no recommendation at this time due to lack of data, insufficient time to assess, and (in some instances) an initial assessment of no significant cost savings to be realized.

	4/4/94
	NATIONAL FACILITIES STUDY
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY
	WORKING GROUP
	CATEGORY 3 WORKSHEET

	Facility	Location	Mission	Cat.
1	Booster Assembly, IRF, PIMS Bay	VAFB	AMROC	3
2	Laboratory, IRF, SIS Lab	VAFB	AMROC	3
3	Launch Pad, SLC-3E, Atlas	VAFB	ATLAS	3
4	Ordnance, Test, Atlas	VAFB	ATLAS	3
5	Admin, Missile Space Research Eng	VAFB	ATLAS	3
6	Admin, Technical Support Facility, (762, 762A)	VAFB	ATLAS	3
7	Launch Control Center, Atlas	VAFB	ATLAS	3
8	Admin, Atlas Command Section, Bay 1	VAFB	ATLAS	3
9	Admin, Atlas Command Section, Bay 2	VAFB	ATLAS	3
10	Launch Pad, SLC-3W, Atlas	VAFB	ATLAS	3
11	Booster Assembly Building, Atlas	VAFB	ATLAS	3
12	Atlas Guidance Station/Titan LCC	VAFB	ATLAS/TITAN	3
13	Storage, Basement, Payload Preparation	VAFB	DMSP	3
14	Payload Preparation, Bay 1	VAFB	DMSP	3
15	Telemetry, GPS Tracking Site	VAFB	GPS	3
16	Launch Control Center, DO	VAFB	MM	3
17	Launch Control Center, EO	VAFB	MM	3
18	Booster Assembly and Checkout Facility	VAFB	MM	3
19	Test, Proofload Test Facility	VAFB	MM	3
20	Booster Assembly, Missile Processing Facility #2	VAFB	MM	3
21	Storage, Battery Storage Bunker	VAFB	MM	3
22	Maintenance, Integrated Checkout Fac., Bay 1	VAFB	MM, PK	3
23	Test, Instru/Flight Safety, ICF	VAFB	MM, PK	3
24	Launch Support Center	VAFB	MM, PK	3
25	Waste Processing, IRF, Washdown Area	VAFB	MM, PK	3
26	Maintenance, IRF, Component Refurbishment Rm	VAFB	MM, PK	3
27	Maintenance, 394 Headquarters Bldg, Bay 1	VAFB	MM, RSLP	3
28	Maintenance, 394 Headquarters Bldg, Bay 2	VAFB	MM, RSLP	3
29	Booster Assembly, Missile Processing Facility #1	VAFB	MM, RSLP	3
30	Booster Assembly, Pegasus, Bay 1	VAFB	PEGASUS	3
31	Booster Assembly, Pegasus, Bay 2	VAFB	PEGASUS	3
32	Booster Assembly, Pegasus, Clean Room	VAFB	PEGASUS	3
33	Maintenance, Mechanical Maint. Fac., Bay 1	VAFB	PK	3
34	Maintenance, Mechanical Maint. Fac., Bay 2	VAFB	PK	3
35	Booster Assembly, SPF-A	VAFB	PK	3
36	Storage, Depot Storage Facility	VAFB	PK	3
37	Booster Assembly, SPF-B	VAFB	PK	3
38	Launch Pad, Rail Garrison Launch Site	VAFB	PK	3
39	Electric Lab, Bay 1	VAFB	PK	3
40	Electric Lab, Bay 2	VAFB	PK	3
41	Payload Assembly Bldg, Bay 1	VAFB	PK	3
42	Payload Assembly Bldg, Bay 2	VAFB	PK	3

	4/4/94 NATIONAL FACILITIES STUDY PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP CATEGORY 3 WORKSHEET			
	Facility	Location	Mission	Cat.
43	Launch Control Center, ITF	VAFB	PK	3
44	Test Operations Control Centers 1, 2, 3, ITF	VAFB	PK	3
45	Test, Test Cells	VAFB	PK	3
46	Storage, Integrated Test Facility, Bay 1	VAFB	PK, SICBM	3
47	Admin, Remote Launch Control	VAFB	SPACE	3
48	Launch Control Center, Remote Launch Ctrl Ctr	VAFB	SPACE	3
49	Launch Pad, Test Igloo (storage), Bay 1	VAFB	SRMU	3
50	Launch Pad, Test Igloo (storage), Bay 2	VAFB	SRMU	3
51	Storage, SRM Storage Bldg, Bay 1	VAFB	TITAN	3
52	Storage, SRM Storage Bldg, Bay 2	VAFB	TITAN	3
53	Booster Assembly, SRMU Assembly & Checkout	VAFB	TITAN	3
54	Admin, Booster Maintenance Support	VAFB	TITAN	3
55	Maintenance, Booster Support, Bay 1	VAFB	TITAN	3
56	Admin, Titan Technical Support #2	VAFB	TITAN	3
57	Launch Control Center, SLC-4	VAFB	TITAN	3
58	Admin, Titan Technical Support #1	VAFB	TITAN	3
59	Booster Assembly, SRM Seg Assembly /Checkout	VAFB	TITAN	3
60	Maintenance, Missile Service 395D	VAFB	TITAN	3
61	Maintenance, Missile Service Facility, 395D (1522/3)	VAFB	TITAN	3
62	Storage, Booster Support	VAFB	TITAN	3
63	Maintenance, Payload Support, Clean Room	VAFB	TITAN	3
64	Payload Processing Facility, Clean Room	VAFB	TITAN	3
65	Booster Assembly, VAB/HTF, Bay 2	VAFB	TITAN	3
66	Booster Assembly, VAB/HTF, High Bay	VAFB	TITAN	3
67	Admin, VAB/HTF	VAFB	TITAN	3
68	Maintenance, VAB/HTF	VAFB	TITAN	3
69	Launch Pad, SLC-4E, Titan IV	VAFB	TITAN IV	3
70	Payload Support Facility, Bay 2	VAFB	TITAN IV	3
71	Payload Support Facility, Bay 3	VAFB	TITAN IV	3
72	Payload Support Facility, Bay 4	VAFB	TITAN IV	3
73	Payload Support Facility, High Bay	VAFB	TITAN IV	3
74	Telemetry, 8 foot Antenna, VTRS	VAFB	VARIOUS	3
75	Telemetry, Quad Helix Antennas (2), VTRS	VAFB	VARIOUS	3
76	Telemetry, Ground Station, VTRS	VAFB	VARIOUS	3
77	Data, Data Center, Weather Station	VAFB	VARIOUS	3
78	Optical, 7 inch Cinetel Telescope	VAFB	VARIOUS	3
79	Transportation, Boat Dock	VAFB	VARIOUS	3
80	Waste Treatment Plant, Industrial (337-341)	VAFB	VARIOUS	3
81	Admin, Frequency Monitoring Facility	VAFB	VARIOUS	3
82	Command Transmtr, Cmd Destruct Monitoring	VAFB	VARIOUS	3
83	Frequency, Frequency Monitoring Facility	VAFB	VARIOUS	3
84	Frequency, Radar Monitoring Facility	VAFB	VARIOUS	3

	4/4/94			
	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 3 WORKSHEET			
	Facility	Location	Mission	Cat.
85	Radar, Air Route Surveillance	VAFB	VARIOUS	3
86	Radar, Microwave & Radio Facility	VAFB	VARIOUS	3
87	Maintenance, Protective Equipment High Bay	VAFB	VARIOUS	3
88	Maintenance, Protective Equipment Low Bay	VAFB	VARIOUS	3
89	Inflation Shelter, Upper Air Observatory	VAFB	VARIOUS	3
90	Fuels, Hypergolic Stockpile Storage (972-979)	VAFB	VARIOUS	3
91	Frequency, HF Radio Transmitting Site	VAFB	VARIOUS	3
92	Maintenance, Munitions	VAFB	VARIOUS	3
93	Launch Pad, SLC-1E (HAIR Site)	VAFB	VARIOUS	3
94	Laboratory, Precision Measurement Equip. Lab.	VAFB	VARIOUS	3
95	Telemetry, Operational Support and Test Fac	VAFB	VARIOUS	3
96	Inflation Shelter, Upper Air Observatory	VAFB	VARIOUS	3
97	Inflation Shelter, Upper Air Observatory	VAFB	VARIOUS	3
98	Transportation, Airfield, Vandenberg AFB	VAFB	VARIOUS	3
99	Radar, Have Stare	VAFB	VARIOUS	3
100	Maintenance, Refurbishment/Corrosion Control	VAFB	VARIOUS	3
101	Frequency, HF Receiver Site	VAFB	VARIOUS	3
102	Laboratory, Radio Frequency Measurement	VAFB	VARIOUS	3
103	Laboratory, Test Area	VAFB	VARIOUS	3
104	Test Van, RF Measurements	VAFB	VARIOUS	3
105	Laboratory, Radio Frequency Measure., Bay 1	VAFB	VARIOUS	3
106	Laboratory, Radio Frequency Measurement	VAFB	VARIOUS	3
107	Test Van, Command Receiver	VAFB	VARIOUS	3
108	Test Van, Range Safety Test Van	VAFB	VARIOUS	3
109	Test Van, Transponder	VAFB	VARIOUS	3
110	Test Van, Transponder Test Van One	VAFB	VARIOUS	3
111	Laboratory, Calibration Lab	VAFB	VARIOUS	3
112	Maintenance, Component Cleaning Fac., Bay 1	VAFB	VARIOUS	3
113	Maintenance, Component Cleaning Fac, Clean Rm	VAFB	VARIOUS	3
114	Admin, Remote Launch Control	VAFB	VARIOUS	3
115	Radar, 60 Foot TT&C Antenna, VTS	VAFB	VARIOUS	3
116	Maintenance, VTS	VAFB	VARIOUS	3
117	Admin, VTS	VAFB	VARIOUS	3
118	Radar, 10 Meter Antenna, VTS	VAFB	VARIOUS	3
119	Radar, 46 Foot TT&C Antenna, VTS	VAFB	VARIOUS	3
120	Optical, 36 Inch Telescope, Anderson Peak	VAFB	VARIOUS	3
121	Optical, 8 Inch Telescope	VAFB	VARIOUS	3
122	Command Transmitter, Site 6, Cmd Destruct	VAFB	VARIOUS	3
123	Telemetry, Receiving, Communications Relay	VAFB	VARIOUS	3
124	Telemetry, Receiving, Ground Station	VAFB	VARIOUS	3
125	Optical, 10 Inch Telescope	VAFB	VARIOUS	3
126	Optical, 24 Inch Telescope	VAFB	VARIOUS	3

	4/4/94
	NATIONAL FACILITIES STUDY
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY
	WORKING GROUP
	CATEGORY 3 WORKSHEET

	Facility	Location	Mission	Cat.
127	Optical, 7 Inch Cinetel Telescope	VAFB	VARIOUS	3
128	ARIA	WPAFB	VARIOUS	3

PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP

LIST OF ALL FACILITIES IN INVENTORY

The following list of facilities represents the Payload Processing, Launch, and Recovery facilities identified during the data acquisition phase of the study and those facilities contained in the Facility Data Base.

	4/4/94			
	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1A WORKSHEET			
	Facility	Location	Mission	Cat.
1	Antigua Radar Bldg	ANTIGUA	VARIOUS	1A
2	Antigua Telemetry Bldg	ANTIGUA	VARIOUS	1A
3	Antigua Command Bldg	ANTIGUA	VARIOUS	1A
4	Antigua Comm/Ops Building	ANTIGUA	VARIOUS	1A
5	Antigua Radar Bldg	ANTIGUA	VARIOUS	1A
6	Ascension Radar Bldg	ASCEN	VARIOUS	1A
7	Ascension Telemetry Bldg	ASCEN	VARIOUS	1A
8	Ascension Comm/Ops Building	ASCEN	VARIOUS	1A
9	Delta Launch Ops Facility	CCAFS	DELTA	1A
10	SLC 17 Blockhouse	CCAFS	DELTA	1A
11	Centaur Processing Facility	CCAFS	TITAN	1A
12	CX-46	CCAFS	TRIDENT	1A
13	Range Operations Control Center (ROCC) Highbays	CCAFS	VARIOUS	1A
14	XY Communication Bldg	CCAFS	VARIOUS	1A
15	Cape Radar Building	CCAFS	VARIOUS	1A
16	FSA -1 Hypergolic Storage Facility	CCAFS	VARIOUS	1A
17	Tel-IV Building / N6-2296	CCAFS/KSC	VARIOUS	1A
18	KSC Radar Building / Q6-82	CCAFS/KSC	VARIOUS	1A
19	Launch Equipment Test Facility (LETF)	KSC	STS	1A
20	Launch Pad 39A	KSC	STS	1A
21	Launch Pad 39B	KSC	STS	1A
22	ASRM Kneel Down Transporter	KSC	STS	1A
23	Helicoptors	KSC	STS	1A
24	Orbiter Protective Enclosure	KSC	STS	1A
25	EOS Facility	KSC/VAFB	EOS	1A
26	Scout Blockhouse/589	KSC/VAFB	SCOUT	1A
27	Scout Fabrication Shop/584	KSC/VAFB	SCOUT	1A
28	Scout Launch Pad and Movable Shelter/580	KSC/VAFB	SCOUT	1A
29	Scout Pad Operations Support Bldg/582	KSC/VAFB	SCOUT	1A
30	Scout Spin Test Blockhouse/996	KSC/VAFB	SCOUT	1A
31	Scout Spin Test Facility/995	KSC/VAFB	SCOUT	1A
32	Scout Spin Test Support Bldg/997	KSC/VAFB	SCOUT	1A
33	VAFB Scout Logistics Bldg/988	KSC/VAFB	SCOUT	1A
34	Payload Processing, Scout/596	KSC/VAFB	SCOUT	1A
35	Scout Ordinance Assy Bldg / 960	KSC/VAFB	SCOUT	1A
36	White Sands Space Harbor	KSC/WSSH	STS	1A
37	PAFB Radar Building	PAFB	VARIOUS	1A
38	Rocket Assembly bldg "C"/PFRR	PFRR	SUBORB	1A
39	Optical Observatory/PFRR	PFRR	SUBORB	1A
40	Launch Areas 3/PFRR	PFRR	SUBORB	1A
41	Poker Flat Telemetry Facility/PFRR	PFRR	SUBORB	1A
42	PFRR Science Operations Center (SOC)	PFRR	SUBORB	1A

	4/4/94			
	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1A WORKSHEET			
	Facility	Location	Mission	Cat.
43	Launch Pad, ABRES A3	VAFB	AMROC	1A
44	Launch Control Center, ABRES A	VAFB	AMROC	1A
45	Payload Processing, Payload Changeout Room	VAFB	Commercia	1A
46	Launch Pad, SLC-6	VAFB	Commercia	1A
47	Admin, SLC-6 Entry Control Point	VAFB	Commercia	1A
48	Launch Pad, SLC-6 Mobile Service Tower (390A)	VAFB	Commercia	1A
49	Launch Pad, SLC-6 Access Tower (390C)	VAFB	Commercia	1A
50	Launch Pad, SLC-6 Launch Mount	VAFB	Commercia	1A
51	Admin, Operations Support Building, SLC-6	VAFB	Commercia	1A
52	Storage Facility, ABRES A	VAFB	Commercia	1A
53	Launch Pad, ABRES A2	VAFB	Commercia	1A
54	Booster Assembly, E'Prime	VAFB	EAGLE	1A
55	Storage, ABRES B	VAFB	EAGLE	1A
56	Admin, Storage Facility, ABRES A	VAFB	OLD ATLAS	1A
57	Storage Facility, ABRES A, Bay 1	VAFB	OLD ATLAS	1A
58	Storage Facility, ABRES A, Bay 2	VAFB	OLD ATLAS	1A
59	Launch Pad, ABRES A1	VAFB	OLD ATLAS	1A
60	Launch Pad, 576E	VAFB	TAURUS	1A
61	Launch Pad, 395A (1875/7/9)	VAFB	TITAN I	1A
62	Admin, SLC-6 North Entry Control Point	VAFB	VARIOUS	1A
63	Booster Assembly, Shuttle Assembly Bldg	VAFB	VARIOUS	1A
64	HVAC, Ice Suppression System, SLC-6	VAFB	VARIOUS	1A
65	HVAC, SLC-6 North Fan House	VAFB	VARIOUS	1A
66	HVAC, Support Equipment/Air Conditioning	VAFB	VARIOUS	1A
67	Fuels, SLC-6 Liquid Hydrogen Storage	VAFB	VARIOUS	1A
68	Admin, SLC-6 Operations Support Bldg	VAFB	VARIOUS	1A
69	Fuels, Helium Transfer Facility	VAFB	VARIOUS	1A
70	Fuels, Fuel Holding Area (390T)	VAFB	VARIOUS	1A
71	Fuels, Oxidizer Holding Area (390P)	VAFB	VARIOUS	1A
72	Waste Processing, Exhaust Ducts (390F/J/K)	VAFB	VARIOUS	1A
73	Launch Control Center, SLC-6	VAFB	VARIOUS	1A
74	Fuels, Propane Storage Tank (393B)	VAFB	VARIOUS	1A
75	HVAC, Support Equipment/Air Conditioning	VAFB	VARIOUS	1A
76	Admin, Ready Building, SLC-6	VAFB	VARIOUS	1A
77	Admin, SLC-6 Complex Service Bldg	VAFB	VARIOUS	1A
78	Laboratory, Fuel Laboratory	VAFB	VARIOUS	1A
79	Radar, Saipan Space Surveillance Station	VAFB	VARIOUS	1A
80	Elec Pwr Stn, ABRES A	VAFB	VARIOUS	1A
81	Telemetry, 10 Meter Antenna, VTRS	VAFB	VARIOUS	1A
82	Telemetry, 30 Foot Antenna, VTRS	VAFB	VARIOUS	1A
83	Radar, AN/FPS-16 #2	VAFB	VARIOUS	1A
84	Radar, AN/FPS-16 #1	VAFB	VARIOUS	1A

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1A WORKSHEET			
	Facility	Location	Mission	Cat.
85	Optical, LA-24 Tracking Telescope	VAFB	VARIOUS	1A
86	Radar, AN/MPS-39 (MOTR)	VAFB	VARIOUS	1A
87	Comm, S. VAFB Communications Center	VAFB	VARIOUS	1A
88	Command Transmitter, Site 3, Cmd Destruct	VAFB	VARIOUS	1A
89	Radar, AN/TPQ-18	VAFB	VARIOUS	1A
90	Command Transmitter, Site 2, Cmd Destruct	VAFB	VARIOUS	1A
91	Radar, High Accuracy Instrumen. Radar (HAIR)	VAFB	VARIOUS	1A
92	ROCC, Acquisition Data System (ADS)	VAFB	VARIOUS	1A
93	ROCC, Launch Operations Control Center	VAFB	VARIOUS	1A
94	ROCC, Missile Flight Control Center	VAFB	VARIOUS	1A
95	ROCC, Range Operations Control Center	VAFB	VARIOUS	1A
96	ROCC, Range Operations Control Center	VAFB	VARIOUS	1A
97	ROCC, Range Safety Display System	VAFB	VARIOUS	1A
98	ROCC, Telemetry Analog Equipment Room	VAFB	VARIOUS	1A
99	ROCC, Telemetry Integrated Processing System	VAFB	VARIOUS	1A
100	ROCC, Area Control Center	VAFB	VARIOUS	1A
101	ROCC, Command Management Center	VAFB	VARIOUS	1A
102	ROCC, Consolidated Range Simulation System	VAFB	VARIOUS	1A
103	ROCC, Microfilm	VAFB	VARIOUS	1A
104	ROCC, Range Control Center #2	VAFB	VARIOUS	1A
105	ROCC, Terminal Room & Prototype Room	VAFB	VARIOUS	1A
106	Comm, Communications Center	VAFB	VARIOUS	1A
107	Comm, Network Control Center	VAFB	VARIOUS	1A
108	Frequency, Frequency Control & Analysis	VAFB	VARIOUS	1A
109	Data, Metric Data Processing System	VAFB	VARIOUS	1A
110	Radar, AN/TPQ-39	VAFB	VARIOUS	1A
111	Data, Operations Center, Weather Station	VAFB	VARIOUS	1A
112	Command Transmitter, Central Control Proc System	VAFB	VARIOUS	1A
113	Command Transmitter, Site 1, Cmd Destruct	VAFB	VARIOUS	1A
114	Comm, Network Control Center	VAFB	VARIOUS	1A
115	Frequency, HF Receiver Station	VAFB	VARIOUS	1A
116	Frequency, HF Transmitter Site	VAFB	VARIOUS	1A
117	Radar, AN/FPQ-14	VAFB	VARIOUS	1A
118	Telemetry, Receiving, 40 foot Antenna	VAFB	VARIOUS	1A
119	Telemetry, Receiving, 80 foot Antenna	VAFB	VARIOUS	1A
120	Command Transmitter, Site 4, Cmd Destruct	VAFB	VARIOUS	1A
121	Radar, AN/FPQ-6	VAFB	VARIOUS	1A
122	Radar, AN/MPS-36	VAFB	VARIOUS	1A
123	Maintenance, Service Shop, ABRES A	VAFB	VARIOUS	1A
124	Maintenance, Service Shop, ABRES A, Bay 1	VAFB	VARIOUS	1A
125	Payload Preparation Room, Bay 1	VAFB	VARIOUS	1A
126	Payload Preparation Room, Bay 2	VAFB	VARIOUS	1A

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1A WORKSHEET			
	Facility	Location	Mission	Cat.
127	Payload Preparation Room, Clean Room	VAFB	VARIOUS	1A
128	NASA 429, I-88 Electra Aircraft	WFF	SUBORB	1A
129	NASA 430 SC-7 Skyvan Aircraft	WFF	SUBORB	1A
130	SELVS Payload Processing Facility/M-16	WFF	SUBORB	1A
131	Above Ground Explosive Storage Magazine/M-20	WFF	SUBORB	1A
132	Payload Assembly and Checkout Bldg/V-25	WFF	SUBORB	1A
133	Payload Assembly and Checkout Bldg/V-26	WFF	SUBORB	1A
134	Pad 4/W-30	WFF	SUBORB	1A
135	Pad 3A Scout Laucher Complex/W-96	WFF	SUBORB	1A
136	NSWC Combat Sys Performance Test Facility/Z-41	WFF	SUBORB	1A
137	Transportable Van #2/40 ft Expandable trailer	WFF	SUBORB	1A
138	NASA 427, C-130Q Aircraft	WFF	SUBORB	1A
139	Orbital Tracking Facility, 7.3M Sys	WFF	SUBORB	1A
140	Orbital Tracking Facility, 18M ADAS	WFF	SUBORB	1A
141	Orbital Tracking Facillity, OTS 1	WFF	SUBORB	1A
142	Orbital Tracking Facility, OTS 2	WFF	SUBORB	1A
143	Orbital Tracking Facility SATAN RX	WFF	SUBORB	1A
144	Orbital Tracking Facility, TDMA	WFF	SUBORB	1A

	4/4/94 NATIONAL FACILITIES STUDY PAYLOAD PROCESSING, LAUNCH, AND RECOVERY WORKING GROUP CATEGORY 1B WORKSHEET			
	Facility	Location	Mission	Cat.
1	Ascension Met Rocket Launch Control Building	ASCEN	NAVY	1B
2	Ascension Met Rocket Munitions Storage	ASCEN	NAVY	1B
3	SLC 36B	CCAFS	ATLAS	1B
4	SLC- 17 A & B	CCAFS	ATLAS	1B
5	SLC-36 Blockhouse	CCAFS	ATLAS	1B
6	Hangar J	CCAFS	ATLAS	1B
7	Delta Mission Checkout Facility	CCAFS	DELTA	1B
8	Delta Solid Motor Assembly Facility (Area 57)	CCAFS	DELTA	1B
9	Delta Solid Motor Storage Facility (Area 57)	CCAFS	DELTA	1B
10	Delta Horizontal Processing Facility	CCAFS	DELTA	1B
11	2nd Stage High Pressure Test Facility	CCAFS	DELTA	1B
12	Delta Solid Motor Storage Facility	CCAFS	DELTA	1B
13	Hangar M	CCAFS	DELTA	1B
14	Delta 2nd Stage Checkout Facility (Area 55)	CCAFS	DELTA	1B
15	Delta Flight Hardware Storage Facility	CCAFS	DELTA	1B
16	DSCS Processing Facility	CCAFS	GPS	1B
17	NAVSTAR Processing Facility	CCAFS	GPS	1B
18	NAVSTAR Satellite Storage Facility	CCAFS	GPS	1B
19	CX 47 Launch Control Bldg	CCAFS	Met Rocket	1B
20	Propellant Servicing Facility	CCAFS	VARIOUS	1B
21	FSA-2	CCAFS	VARIOUS	1B
22	Satellite Assembly Building	CCAFS	VARIOUS	1B
23	FSA-5	CCAFS	VARIOUS	1B
24	Command/Control Building	CCAFS	VARIOUS	1B
25	Cape Weather Operations Building	CCAFS	VARIOUS	1B
26	CX-20 Blockhouse	CCAFS	VARIOUS	1B
27	Orbiter Mate/Demate Device (MDD)	DRYDEN	STS	1B
28	Scientific Baloon Flight Facility/ Ft Sumner New Mexico	FT SUMNER	SUBORB	1B
29	Airlock/M7-360/SSPF	KSC	STS	1B
30	High Bay/M7-360/SSPF	KSC	STS	1B
31	Intermediate Bay/M7-360/SSPF	KSC	STS	1B
32	Support Areas/M7-360/SSPF	KSC	STS	1B
33	KSC Shuttle Landing Facility	KSC	STS	1B
34	Orbiter Mate/Demate Device (MDD)	KSC	STS	1B
35	Base Operations Bldg/M6-339	KSC	STS	1B
36	Canister Rotation Facility	KSC	STS	1B
37	Central Instrumentation Facility (CIF)	KSC	STS	1B
38	Central Supply Warehouse (M6-744)	KSC	STS	1B
39	Supply Warehouse No. 1, M6-794	KSC	STS	1B
40	Supply Warehouse No. 2, M6-698	KSC	STS	1B
41	Crawler Transporter, CT1	KSC	STS	1B
42	Crawler Transporter, CT2	KSC	STS	1B

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1B WORKSHEET			
	Facility	Location	Mission	Cat.
43	Electromagnetic Laboratory	KSC	STS	1B
44	Engineering Development Laboratory	KSC	STS	1B
45	Headquarters Bldg/M6-399	KSC	STS	1B
46	High Bay 1 Cell/VAB	KSC	STS	1B
47	High Bay 2 Cell/VAB	KSC	STS	1B
48	High Bay 3 Cell/VAB	KSC	STS	1B
49	High Bay 4 Cell/VAB	KSC	STS	1B
50	High Bay Towers (6)/VAB	KSC	STS	1B
51	High Bay Transfer Aisle/VAB	KSC	STS	1B
52	LB Cells (4) LB Area/East/VAB	KSC	STS	1B
53	LB Cells (4) LB Area/West/VAB	KSC	STS	1B
54	LB Transfer Aisle/VAB	KSC	STS	1B
55	Utility Annex/K6-947	KSC	STS	1B
56	HMF N. Processing Bldg/E. High Bay/M7-961	KSC	STS	1B
57	HMF N. Processing Bldg/Support Area/M7-961	KSC	STS	1B
58	HMF N. Processing Bldg/W. High Bay/M7-961	KSC	STS	1B
59	HMF S. Processing Bldg/E. High Bay/M7-1212	KSC	STS	1B
60	HMF S. Processing Bldg/Support Area/M7-1212	KSC	STS	1B
61	HMF S. Processing Bldg/West High Bay/M7-1212	KSC	STS	1B
62	HMF Storage Bldg East/M7-1412	KSC	STS	1B
63	HMF Storage Bldg West/M7-1410	KSC	STS	1B
64	HMF Support Bldg/M7-1061	KSC	STS	1B
65	Launch Equipment Shop (LES)	KSC	STS	1B
66	LCC/4th Floor Office	KSC	STS	1B
67	LCC Control Room 1/FR-1/Third Floor	KSC	STS	1B
68	LCC Control Room 2/FR-2/Third Floor	KSC	STS	1B
69	LCC Control Room 3/FR-3/Third Floor	KSC	STS	1B
70	LCC Control Room 4/FR-4/Third Floor	KSC	STS	1B
71	LCC/First Floor Office	KSC	STS	1B
72	LPS Central Data Subsystem Area/2nd Floor	KSC	STS	1B
73	Logistics Facility/K6-1547	KSC	STS	1B
74	Mobile Launcher Platform 1	KSC	STS	1B
75	Mobile Launcher Platform 2	KSC	STS	1B
76	Mobile Launcher Platform 3	KSC	STS	1B
77	Operations Support Bldg/K6-1096	KSC	STS	1B
78	OPF Annex 1 & 2	KSC	STS	1B
79	OPF Bay 1	KSC	STS	1B
80	OPF Bay 2	KSC	STS	1B
81	OPF HB 3	KSC	STS	1B
82	OPF Low Bay 3	KSC	STS	1B
83	OPF Low Bay Area/OPF 1 & 2	KSC	STS	1B
84	Orbiter Transporter, P70-0854	KSC	STS	1B

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1B WORKSHEET			
	Facility	Location	Mission	Cat.
85	Ordnance Storage Facility	KSC	STS	1B
86	Payload Shipping Cont. (Hubble) (P70-0870)	KSC	STS	1B
87	Payload Canister (P70-0870) 2 EA	KSC	STS	1B
88	Payload Support Facility/M7-505	KSC	STS	1B
89	Processing Control Center/K6-1094	KSC	STS	1B
90	SRM Contractor Support Bldg/K6-0445	KSC	STS	1B
91	SRM Shop/Storage Bldg/K6-0446	KSC	STS	1B
92	SRM Support Bldg/K6-0495	KSC	STS	1B
93	SRM Surge Bldg #1/K6-0497	KSC	STS	1B
94	SRM Surge Bldg #2/K6-0345	KSC	STS	1B
95	SRM Rotation/Processing Fac./K6-0494	KSC	STS	1B
96	SRM Transporter (P77V-0828) (2)	KSC	STS	1B
97	VPF Airlock	KSC	STS	1B
98	VPF High Bay	KSC	STS	1B
99	VPF Operation Support Bldg	KSC	STS	1B
100	Thermal Protection System (TPS) Fac.	KSC	STS	1B
101	Turn Basin	KSC	STS	1B
102	Big 3 Facility	KSC	STS	1B
103	Converter Compressed Facility (CCF)	KSC	STS	1B
104	SAEF-2 Airlock/M7-1210	KSC	STS/ELV	1B
105	SAEF-2 High Bay/M7-1210	KSC	STS/ELV	1B
106	SAEF-2 Support Areas/M7-1210	KSC	STS/ELV	1B
107	Airlock/Payload Hazardous Servicing Fac.	KSC	STS/ELV	1B
108	Facility Control Bldg/PHSF	KSC	STS/ELV	1B
109	High Bay/Payload Hazardous Servicing Fac.	KSC	STS/ELV	1B
110	Radioisotope Thermal Generator Facility	KSC	STS/ELV	1B
111	CD&SC	KSC	STS/ELV	1B
112	Payload Storage Bldg	KSC	VARIOUS	1B
113	Development Test Lab/M7-581	KSC	VARIOUS	1B
114	Edwards AFB	KSC/CALIF.	STS	1B
115	CCAFS Engineering and Operations Bldg/60650	KSC/CCAFS	ELV	1B
116	North Wing/AE	KSC/CCAFS	ELV	1B
117	South Wing/AE	KSC/CCAFS	ELV	1B
118	SRB Recovery Facility/AF	KSC/CCAFS	STS	1B
119	SRB Recovery Ships/NA	KSC/CCAFS	STS	1B
120	Airlock/Hangar S	KSC/CCAFS	STS/ELV	1B
121	Control Room 1/Hangar S	KSC/CCAFS	STS/ELV	1B
122	Control Room 2/Hangar S	KSC/CCAFS	STS/ELV	1B
123	High Bay 1/Hangar S	KSC/CCAFS	STS/ELV	1B
124	High Bay 2/Hangar S	KSC/CCAFS	STS/ELV	1B
125	South Annex/Hangar S	KSC/CCAFS	STS/ELV	1B
126	Support Areas/Hangar S	KSC/CCAFS	STS/ELV	1B

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1B WORKSHEET			
	Facility	Location	Mission	Cat.
127	Central Frame Low Bay/AE	KSC/CCAFS	STS/ELV	1B
128	High Bay Clean Room Complex/AE	KSC/CCAFS	STS/ELV	1B
129	Hangar L, LSSF	KSC/CCAFS	STS/ELV	1B
130	Missile Research Test Bldg (MRTB)	KSC/CCAFS	STS/ELV	1B
131	Yundum International	KSC/GAMBIA	STS	1B
132	Anderson Air Force Base	KSC/GUAM	STS	1B
133	Hickam Air Force Base	KSC/HAWAII	STS	1B
134	Ben Guerir Air Field	KSC/MOROCCO	STS	1B
135	Moron Air Base	KSC/SPAIN	STS	1B
136	Zaragoza Airbase	KSC/SPAIN	STS	1B
137	Delta Administrative/1628	KSC/VAFB	DELTA	1B
138	Delta Launch Control Center/1622	KSC/VAFB	DELTA	1B
139	Delta Launch Pad/1623	KSC/VAFB	DELTA	1B
140	Delta SRM Processing HB/1670	KSC/VAFB	DELTA	1B
141	Delta SRM Processing LB/1670	KSC/VAFB	DELTA	1B
142	Delta Tech. Shops/1615/1618/1621/1629/1632	KSC/VAFB	DELTA	1B
143	Mission Directors Center/840	KSC/VAFB	DELTA	1B
144	VAFB Engineering and Operations/840	KSC/VAFB	DELTA	1B
145	VAFB NASA Supply Bldg/839	KSC/VAFB	DELTA	1B
146	High Bay/VAFB Spacecraft Lab	KSC/VAFB	DELTA	1B
147	VAFB Support Shop/831	KSC/VAFB	DELTA	1B
148	VAFB Hazardous Payload Processing Bldg/1610	KSC/VAFB	NOAA	1B
149	Spacecraft Lab 1/836	KSC/VAFB	VARIOUS	1B
150	Spacecraft Lab 2/836	KSC/VAFB	VARIOUS	1B
151	Telemetry Station/836	KSC/VAFB	VARIOUS	1B
152	VAFB Tracking Station/810/811	KSC/VAFB	VARIOUS	1B
153	Emergency Landing Sites (ELS) High Inclination	KSC/VARIOUS	STS	1B
154	Emergency Landing Sites (ELS) Low Inclination	KSC/VARIOUS	STS	1B
155	Test and Evaluation Bldg # 25 NSBF Texas	NSBF	SUBORB	1B
156	High Bay Staging Area (East)	NSBF	SUBORB	1B
157	High Bay Staging Area (West)	NSBF	SUBORB	1B
158	Operations Contorl Center	NSBF	SUBORB	1B
159	Bockhouse PFRR	PFRR	SUBORB	1B
160	Payload Assembly Bldg PFRR	PFRR	SUBORB	1B
161	Poker Flat Research Range Office PFRR	PFRR	SUBORB	1B
162	Rocket Storage Bldg PFRR	PFRR	SUBORB	1B
163	Launch Areas 1&2 PFRR	PFRR	SUBORB	1B
164	Launch Area 4 PFRR	PFRR	SUBORB	1B
165	JDMTA Instumentation Facility	Stuart, FL	VARIOUS	1B
166	Launch Pad, 576G	VAFB	ATLAS	1B
167	Launch Pad, LF-21	VAFB	MM	1B
168	Launch Pad, LF-23	VAFB	MM	1B

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 1B WORKSHEET			
	Facility	Location	Mission	Cat.
169	Launch Pad, LF-24	VAFB	MM	1B
170	Launch Pad, LF-25	VAFB	MM	1B
171	Launch Pad, LF-10	VAFB	MM	1B
172	Launch Pad, LF-26	VAFB	MM	1B
173	Launch Pad, LF-04	VAFB	MM	1B
174	Launch Control Center, 01B	VAFB	MM	1B
175	Launch Pad, LF-07	VAFB	MM	1B
176	Launch Pad, LF-09	VAFB	MM	1B
177	Launch Control Center, 01A	VAFB	MM, PK	1B
178	Launch Control Center, 01E-01C	VAFB	MM, PK	1B
179	Launch Pad, LF-08	VAFB	PK	1B
180	Launch Pad, Test Pad 01	VAFB	PK	1B
181	Launch Pad, LF-02	VAFB	PK	1B
182	Launch Pad, LF-05	VAFB	PK	1B
183	Launch Pad, LF-03	VAFB	RSLP	1B
184	Launch Pad Shelter, LF-03	VAFB	RSLP	1B
185	Launch Pad Shelter, LF-06	VAFB	RSLP	1B
186	Launch Pad, LF-06	VAFB	RSLP	1B
187	Launch Pad, 395D	VAFB	TITAN	1B
188	Radar 6/Y-60	WFF	SUBORB	1B
189	Mobile Range Instrumentation Radar #2	WFF	SUBORB	1B
190	Mobile Range Instrumentation Radar #8	WFF	SUBORB	1B
191	Mobile Range Instrumentation Radar #9	WFF	SUBORB	1B
192	NASA 426, P-3B Aircraft	WFF	SUBORB	1B
193	Aircraft Wash Apron	WFF	SUBORB	1B
194	Fuel Truck Parking Apron	WFF	SUBORB	1B
195	Runway 04/22	WFF	SUBORB	1B
196	Runway 10/28	WFF	SUBORB	1B
197	Runway 17/35	WFF	SUBORB	1B
198	WFF Control Tower Cab	WFF	SUBORB	1B
199	Runway Radar 18	WFF	SUBORB	1B
200	Fire Station	WFF	SUBORB	1B
201	Airborne Radar System O&M Shop	WFF	SUBORB	1B
202	Hangar Bay D-1	WFF	SUBORB	1B
203	Closed Circuit Television	WFF	SUBORB	1B
204	Information Technology Center	WFF	SUBORB	1B
205	Procurement and Fiscal Offices Library/ E-105	WFF	SUBORB	1B
206	Technical Library	WFF	SUBORB	1B
207	Code 840 Integrated Data Systtem Office	WFF	SUBORB	1B
208	Computer room	WFF	SUBORB	1B
209	Intrumentation Room	WFF	SUBORB	1B
210	Range Control Center	WFF	SUBORB	1B

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	NATIONAL FACILITIES STUDY
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY
	WORKING GROUP
	CATEGORY 1B WORKSHEET

	Facility	Location	Mission	Cat.
211	Range Management Office	WFF	SUBORB	1B
212	Sounding Rocket/Balloon Projects Office	WFF	SUBORB	1B
213	Weather Forecast Office	WFF	SUBORB	1B
214	Data and Communications Systems Section Eng Lab	WFF	SUBORB	1B
215	Range Engineering E-108	WFF	SUBORB	1B
216	Telemetry Lab	WFF	SUBORB	1B
217	Data and Communications Systems Section Eng Lab	WFF	SUBORB	1B
218	Mobile Radar Shop/Office/Storage E-134	WFF	SUBORB	1B
219	Ionospheric Sounding, E-144	WFF	SUBORB	1B
220	Reproduction and Graphics Arts	WFF	SUBORB	1B
221	Telecommunications Facility	WFF	SUBORB	1B
222	WFF Administration	WFF	SUBORB	1B
223	Logistics, Management and Shipping	WFF	SUBORB	1B
224	Printed Circuit Layout and Photo Plotting Lab	WFF	SUBORB	1B
225	Printed Circuit Processing Lab	WFF	SUBORB	1B
226	Supply	WFF	SUBORB	1B
227	Ultrasonic Cleaning Facility	WFF	SUBORB	1B
228	Attitude Control Sys. Lab. Pneumatic Fabrication & Test	WFF	SUBORB	1B
229	Attitude Control System Lab. -Elec Fabrication & Test	WFF	SUBORB	1B
230	Attitude Control System Lab- Magnetic Air Bearing	WFF	SUBORB	1B
231	Dynamic Balance Facility	WFF	SUBORB	1B
232	Experimental Mechanical Construction	WFF	SUBORB	1B
233	Flight Vehicle and Systems Section Lab	WFF	SUBORB	1B
234	Integration and Checkout Facility	WFF	SUBORB	1B
235	Liquid Nitrogen Facility	WFF	SUBORB	1B
236	Mass Properties Measurements Lab	WFF	SUBORB	1B
237	Rotary Accelerator Lab	WFF	SUBORB	1B
238	Spin Test and Development Lab	WFF	SUBORB	1B
239	Statics Load Lab	WFF	SUBORB	1B
240	Thermal Vacuum and Space Simulation Lab	WFF	SUBORB	1B
241	Vibration Lab	WFF	SUBORB	1B
242	Facility Operations Shop F-16	WFF	SUBORB	1B
243	Receiving, F-19	WFF	SUBORB	1B
244	Magnetic Field Simulation Laboratory/ F-23	WFF	SUBORB	1B
245	Quality Verification Facility F-160	WFF	SUBORB	1B
246	Earthen Covered Bunker Storage Magazine M-9	WFF	SUBORB	1B
247	Earthen Covered Bunker Storage Magazine M-10	WFF	SUBORB	1B
248	Earthen Covered Bunker Storage Magazine M-11	WFF	SUBORB	1B
249	Earthen Covered Bunker Storage Magazine M-12	WFF	SUBORB	1B
250	Earthen Covered Bunker Storage Magazine M-14	WFF	SUBORB	1B
251	Explosive Support M-15	WFF	SUBORB	1B
252	Above Ground Explosive Storage Magazine M-22	WFF	SUBORB	1B

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	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY
	WORKING GROUP
	CATEGORY 1B WORKSHEET

	Facility	Location	Mission	Cat.
253	Reception Center And Visitor Control N-127	WFF	SUBORB	1B
254	ASR-7 Radar System Operation And Maintenance	WFF	SUBORB	1B
255	Balloon R&D Laboratory	WFF	SUBORB	1B
256	Main Base Terminal	WFF	SUBORB	1B
257	N-159 Hangar Bay	WFF	SUBORB	1B
258	Data Analysis Lab N-161	WFF	SUBORB	1B
259	Master Timing Station	WFF	SUBORB	1B
260	Meteorological Operations	WFF	SUBORB	1B
261	Mobile Telemetry MT1	WFF	SUBORB	1B
262	Mobile Telemetry MT2	WFF	SUBORB	1B
263	Mobile Telemetry MT3	WFF	SUBORB	1B
264	Orbital Tracking Facility, TOMS 24ft Sys	WFF	SUBORB	1B
265	RF Communications Receiver Site	WFF	SUBORB	1B
266	Telemetry Systems	WFF	SUBORB	1B
267	Meteorological Ballon Launch Facility N-179	WFF	SUBORB	1B
268	ASRF UHF Radar U-25	WFF	SUBORB	1B
269	ASRF (SPANDAR) Radar Signal Processor (RSP-S)	WFF	SUBORB	1B
270	ASRF (SPANDAR) S Band Radar	WFF	SUBORB	1B
271	ASRF Electric Field Mill Network (EFMN)	WFF	SUBORB	1B
272	ASRF Env. Data Acq. & Data Recording Sys (EDARS)	WFF	SUBORB	1B
273	ASRF Lightning Detection And Ranging	WFF	SUBORB	1B
274	ASRF SFERICS Facility	WFF	SUBORB	1B
275	ASRF UHF Radar Signal Processor	WFF	SUBORB	1B
276	Mobile Radar Laboratory U-40	WFF	SUBORB	1B
277	Command Transmitter, U-55	WFF	SUBORB	1B
278	Communications Transmitters, U-55	WFF	SUBORB	1B
279	AN-FPQ-6 Radar U-70	WFF	SUBORB	1B
280	Camara Station #4 U-80	WFF	SUBORB	1B
281	Camara Station #5 Short Range Optical Tracker	WFF	SUBORB	1B
282	Camara Station #8 MARKI IFLOT	WFF	SUBORB	1B
283	Camara Station #15 MARKIII IFLOT	WFF	SUBORB	1B
284	Camara Station #2 Short Range Optical Tracker	WFF	SUBORB	1B
285	Spin Control Control Center V-50	WFF	SUBORB	1B
286	North Spin Bay, V-55	WFF	SUBORB	1B
287	South Spin Bay, V-45	WFF	SUBORB	1B
288	Rocket Motor Storage V-80	WFF	SUBORB	1B
289	AML 20k Launcher Pad 3B W-5	WFF	SUBORB	1B
290	Assembly Shop 4 W-15	WFF	SUBORB	1B
291	Blockhouse #3 W-20	WFF	SUBORB	1B
292	Range Ground Support Equip Bldg W-22	WFF	SUBORB	1B
293	Assembly Shop 5 W-40	WFF	SUBORB	1B
294	Pad 5 W-45	WFF	SUBORB	1B

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	WORKING GROUP			
	CATEGORY 1B WORKSHEET			
	Facility	Location	Mission	Cat.
295	Fixed Area Dome V-100, W-60, W-115, Y-110	WFF	SUBORB	1B
296	Assembly Shop 3 W-65	WFF	SUBORB	1B
297	Damage Control Fire Station X-5	WFF	SUBORB	1B
298	SPS-64 Radar Installation X-7	WFF	SUBORB	1B
299	Island Optical Sectiopn X-15	WFF	SUBORB	1B
300	Payload Processing Facility X-15	WFF	SUBORB	1B
301	Paint Shop Support Bldg X-30	WFF	SUBORB	1B
302	Launcher Maintenance Facility (Room 100) X-35	WFF	SUBORB	1B
303	Launch Support Services Bldg X-55	WFF	SUBORB	1B
304	Island Terminal Bldg X-75	WFF	SUBORB	1B
305	Meteorological Observation Center X-85	WFF	SUBORB	1B
306	Meteorological Instrument Development Lab X-86	WFF	SUBORB	1B
307	Assembly Shop2 Y-15	WFF	SUBORB	1B
308	Blockhouse 2 Y-30	WFF	SUBORB	1B
309	Launch Pad 2 Y-35, Y-35B	WFF	SUBORB	1B
310	Radar 3 Y-55	WFF	SUBORB	1B
311	300' Met Tower Y-81	WFF	SUBORB	1B
312	160' Met Tower Y-85	WFF	SUBORB	1B
313	Liquid Propellant Storage Z-20 and Z-25	WFF	SUBORB	1B
314	Launch Area "0" Service Bldg Z-40	WFF	SUBORB	1B
315	Block House 1 Z-65	WFF	SUBORB	1B
316	Launch Pad 1 Z-70	WFF	SUBORB	1B
317	Camara Station Z-100	WFF	SUBORB	1B
318	Launch Pad 0A Pad 0A	WFF	SUBORB	1B
319	WFF Cable Plant	WFF	SUBORB	1B
320	Mobile 7.5KMRL Launcher	WFF	SUBORB	1B
321	Mobile Equipment Shipping Containers	WFF	SUBORB	1B
322	Mobile Improved "HAD" Launchers 1 &2	WFF	SUBORB	1B
323	Mobile Improved "HAD" Launcher 3	WFF	SUBORB	1B
324	Mobile Range Instrumentation Radar 10	WFF	SUBORB	1B
325	New Mobile TM Trailer 40'	WFF	SUBORB	1B
326	Transportable Clean Room #1	WFF	SUBORB	1B
327	Transportable Clean Room #2	WFF	SUBORB	1B
328	Transportable Clean Room #3	WFF	SUBORB	1B
329	Transportable Orbital Tracking System (TOTS)	WFF	SUBORB	1B
330	Transportable Van #1 26' RV	WFF	SUBORB	1B
331	New Transportable Van # TBA/ 40' Expandable Trailer	WFF	SUBORB	1B
332	TOTS expandable ISO Container	WFF	SUBORB	1B
333	Launch Complex -36 (LC-36) (630 Launcher Complex) WSMI	WSMR	SUBORB	1B

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	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 2 WORKSHEET			
	Facility	Location	Mission	Cat.
1	Ascension Island Weather Station	ASCEN	VARIOUS	2
2	Hangar K	CCAFS	ATLAS	2
3	SLC-36A	CCAFS	ATLAS	2
4	Solid Motor Assembly Readiness Facility	CCAFS	TITAN	2
5	SLC-40	CCAFS	TITAN	2
6	Solid Motor Assembly Bldg - EastBay	CCAFS	TITAN	2
7	SLC - 41 (2)	CCAFS	TITAN	2
8	Launch Operations Control Center	CCAFS	TITAN	2
9	Titan X-Ray Facility	CCAFS	TITAN	2
10	Receipt Inspection Shop	CCAFS	TITAN	2
11	Payload Fairing Cleaning Facility	CCAFS	TITAN	2
12	Solid Motor Assebly Bldg - Highbay	CCAFS	TITAN	2
13	Verticle Integration Bldg Cell 3	CCAFS	TITAN	2
14	VIB Cell 1	CCAFS	TITAN	2
15	VIB Cell 2	CCAFS	TITAN	2
16	VIB Cell 4	CCAFS	TITAN	2
17	Spacecraft Processing and Integration Facility	CCAFS	VARIOUS	2
18	Range Control Center (RCC)	CCAFS	VARIOUS	2
19	Central Computer Complex	CCAFS	VARIOUS	2
20	Skid Strip	CCAFS	VARIOUS	2
21	MILA Unified `S' Band Facility/Ponce de Leon	KSC	STS	2
22	Altitude Chambers/Deactivated/O&C	KSC	STS	2
23	ATM Clean Room/O&C	KSC	STS	2
24	High Bay/Low Bay/Processing Rooms/O&C	KSC	STS	2
25	Payload Canister Transporter 2EA	KSC	STS	2
26	Modular Office Complex/K6-1200	KSC	STS	2
27	NSLD Bldg 1 - Repair/Service Center	KSC	STS	2
28	NSLD Bldg 2 - Administrative/Engineering	KSC	STS	2
29	NSLD Support Bldg 3/Lab and Test Fac.	KSC	STS	2
30	NSLD Support Bldg 4/Flight Hardware Storage	KSC	STS	2
31	NSLD Support Bldg 5/Receive & Inspec. Fac.	KSC	STS	2
32	NSLD Support Bldg 6/Raw Material Storage	KSC	STS	2
33	Railroad Repair Facility/Equip.	KSC	STS	2
34	High Bay/M7-1104/PSTF-R	KSC	STS/ELV	2
35	Bermuda Tracking Station	KSC/BERMUDA	STS	2
36	ESA 60A DBL Bldg Control Room	KSC/CCAFS	STS/ELV	2
37	ESA 60A DBL Bldg Laboratory	KSC/CCAFS	STS/ELV	2
38	ESA 60A GSE Storage Bldg	KSC/CCAFS	STS/ELV	2
39	ESA 60A S&A Bldg Airlock	KSC/CCAFS	STS/ELV	2
40	ESA 60A S&A Bldg North High Bay	KSC/CCAFS	STS/ELV	2
41	ESA 60A S&A Bldg South High Bay	KSC/CCAFS	STS/ELV	2
42	ESA 60A S&A Control Bldg	KSC/CCAFS	STS/ELV	2

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	NATIONAL FACILITIES STUDY			
	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 2 WORKSHEET			
	Facility	Location	Mission	Cat.
43	High Energy X-Ray Facility (HERF)	KSC/CCAFS	STS/ELV	2
44	Airlock/Hangar AM	KSC/CCAFS	STS/ELV	2
45	Control Room/Hangar AM	KSC/CCAFS	STS/ELV	2
46	High Bay/Hangar AM	KSC/CCAFS	STS/ELV	2
47	Support Areas/Hangar AM	KSC/CCAFS	STS/ELV	2
48	Airlock/Hangar AO	KSC/CCAFS	STS/ELV	2
49	Control Rooms/Hangar AO	KSC/CCAFS	STS/ELV	2
50	High Bay/Hangar AO	KSC/CCAFS	STS/ELV	2
51	ESA 60A Satellite Assembly Bldg	KSC/CCAFS	VARIOUS	2
52	ESA 60 Dynamic Balance lab	KSC/CCAFS	VARIOUS	2
53	Orb Post Landing Safing Equip.	KSC/WSSH	STS	2
54	Booster Assembly, IRF, High Bay	VAFB	AMROC	2
55	Storage, Atlas Storage Facility	VAFB	ATLAS	2
56	Storage, Atlas Storage Facility	VAFB	ATLAS	2
57	Storage, Atlas Booster	VAFB	ATLAS	2
58	Storage, Atlas Storage Facility	VAFB	ATLAS	2
59	Storage, 576C	VAFB	ATLAS	2
60	Payload Fairing, Atlas, Clean Room	VAFB	ATLAS	2
61	Maintenance, Machine, Atlas	VAFB	ATLAS	2
62	Maintenance, Integ. Refurb. Fac., Paint Booth	VAFB	ATLAS	2
63	Payload Test Facility, Clean Room	VAFB	DMSP	2
64	Payload Test Facility, Bay 1	VAFB	DMSP	2
65	Payload Test Facility, Bay 2	VAFB	DMSP	2
66	Storage, Missile Storage Bunker (6811-6815)	VAFB	MM	2
67	Storage, Minuteman Bunker (6819/20/21)	VAFB	MM	2
68	Storage, Instru/Flight Safety, ICF	VAFB	MM, PK	2
69	Maintenance, IRF, Component Refurbishment	VAFB	MM, PK	2
70	Payload Processing, Reentry Vehicle Processing	VAFB	MM, PK	2
71	Storage, Reusable Container Storage	VAFB	PK	2
72	Ordnance, Ordnance Storage Bldg	VAFB	PK	2
73	Ordnance, Ordnance Storage Bldg	VAFB	PK	2
74	Ordnance, Ordnance Storage Bldg	VAFB	PK	2
75	Booster Assy, Missile Assembly Bldg, Addition	VAFB	RSLP	2
76	Booster Assy, Missile Assembly Bldg, Low Bay	VAFB	RSLP	2
77	Booster Assy, Missile Assy Bldg, Transfer Room	VAFB	RSLP	2
78	Booster Assy, Missile Assy Bldg, Clean Room	VAFB	RSLP,TAURUS	2
79	Transportation, Rail Transfer Facility	VAFB	SICBM	2
80	Payload Processing, Small Payloads	VAFB	TAURUS	2
81	Booster Assy, Missile Assembly Bldg, High Bay	VAFB	TAURUS	2
82	Storage, SRMU Equipment	VAFB	TITAN	2
83	Ordnance, Titan Ordnance Bunker	VAFB	TITAN	2
84	Storage, Hazardous Waste Storage	VAFB	TITAN	2

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	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 2 WORKSHEET			
	Facility	Location	Mission	Cat.
85	Storage, SRMU Electronics Storage	VAFB	TITAN	2
86	Storage, Booster Support , Flammable Storage	VAFB	TITAN	2
87	Payload Processing Facility, High Bay	VAFB	TITAN	2
88	Maintenance, Titan Maintenance	VAFB	TITAN	2
89	Maintenance, Titan Maintenance	VAFB	TITAN	2
90	Payload Processing Facility, Low Bay	VAFB	TITAN	2
91	Booster Assembly, SRMU X-ray Facility	VAFB	TITAN	2
92	HVAC, SLC-4W Payload HVAC	VAFB	TITAN II	2
93	Storage, SLC-4W Equipment Storage	VAFB	TITAN II	2
94	Launch Pad, SLC-4W, Titan II	VAFB	TITAN II	2
95	Maintenance, SLC-4W, Contractor Service Bldg	VAFB	TITAN II	2
96	Waste Processing, Hypergolic Waste Tank	VAFB	VARIOUS	2
97	Anechoic Chamber	VAFB	VARIOUS	2

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	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 3 WORKSHEET			
	Facility	Location	Mission	Cat.
1	Booster Assembly, IRF, PIMS Bay	VAFB	AMROC	3
2	Laboratory, IRF, SIS Lab	VAFB	AMROC	3
3	Launch Pad, SLC-3E, Atlas	VAFB	ATLAS	3
4	Ordnance, Test, Atlas	VAFB	ATLAS	3
5	Admin, Missile Space Research Eng	VAFB	ATLAS	3
6	Admin, Technical Support Facility, (762, 762A)	VAFB	ATLAS	3
7	Launch Control Center, Atlas	VAFB	ATLAS	3
8	Admin, Atlas Command Section, Bay 1	VAFB	ATLAS	3
9	Admin, Atlas Command Section, Bay 2	VAFB	ATLAS	3
10	Launch Pad, SLC-3W, Atlas	VAFB	ATLAS	3
11	Booster Assembly Building, Atlas	VAFB	ATLAS	3
12	Atlas Guidance Station/Titan LCC	VAFB	ATLAS/TITAN	3
13	Storage, Basement, Payload Preparation	VAFB	DMSP	3
14	Payload Preparation, Bay 1	VAFB	DMSP	3
15	Telemetry, GPS Tracking Site	VAFB	GPS	3
16	Launch Control Center, DO	VAFB	MM	3
17	Launch Control Center, EO	VAFB	MM	3
18	Booster Assembly and Checkout Facility	VAFB	MM	3
19	Test, Proofload Test Facility	VAFB	MM	3
20	Booster Assembly, Missile Processing Facility #2	VAFB	MM	3
21	Storage, Battery Storage Bunker	VAFB	MM	3
22	Maintenance, Integrated Checkout Fac., Bay 1	VAFB	MM, PK	3
23	Test, Instru/Flight Safety, ICF	VAFB	MM, PK	3
24	Launch Support Center	VAFB	MM, PK	3
25	Waste Processing, IRF, Washdown Area	VAFB	MM, PK	3
26	Maintenance, IRF, Component Refurbishment Rm	VAFB	MM, PK	3
27	Maintenance, 394 Headquarters Bldg, Bay 1	VAFB	MM, RSLP	3
28	Maintenance, 394 Headquarters Bldg, Bay 2	VAFB	MM, RSLP	3
29	Booster Assembly, Missile Processing Facility #1	VAFB	MM, RSLP	3
30	Booster Assembly, Pegasus, Bay 1	VAFB	PEGASUS	3
31	Booster Assembly, Pegasus, Bay 2	VAFB	PEGASUS	3
32	Booster Assembly, Pegasus, Clean Room	VAFB	PEGASUS	3
33	Maintenance, Mechanical Maint. Fac., Bay 1	VAFB	PK	3
34	Maintenance, Mechanical Maint. Fac., Bay 2	VAFB	PK	3
35	Booster Assembly, SPF-A	VAFB	PK	3
36	Storage, Depot Storage Facility	VAFB	PK	3
37	Booster Assembly, SPF-B	VAFB	PK	3
38	Launch Pad, Rail Garrison Launch Site	VAFB	PK	3
39	Electric Lab, Bay 1	VAFB	PK	3
40	Electric Lab, Bay 2	VAFB	PK	3
41	Payload Assembly Bldg, Bay 1	VAFB	PK	3
42	Payload Assembly Bldg, Bay 2	VAFB	PK	3

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	CATEGORY 3 WORKSHEET

	Facility	Location	Mission	Cat.
43	Launch Control Center, ITF	VAFB	PK	3
44	Test Operations Control Centers 1, 2, 3, ITF	VAFB	PK	3
45	Test, Test Cells	VAFB	PK	3
46	Storage, Integrated Test Facility, Bay 1	VAFB	PK, SICBM	3
47	Admin, Remote Launch Control	VAFB	SPACE	3
48	Launch Control Center, Remote Launch Ctrl Ctr	VAFB	SPACE	3
49	Launch Pad, Test Igloo (storage), Bay 1	VAFB	SRMU	3
50	Launch Pad, Test Igloo (storage), Bay 2	VAFB	SRMU	3
51	Storage, SRM Storage Bldg, Bay 1	VAFB	TITAN	3
52	Storage, SRM Storage Bldg, Bay 2	VAFB	TITAN	3
53	Booster Assembly, SRMU Assembly & Checkout	VAFB	TITAN	3
54	Admin, Booster Maintenance Support	VAFB	TITAN	3
55	Maintenance, Booster Support, Bay 1	VAFB	TITAN	3
56	Admin, Titan Technical Support #2	VAFB	TITAN	3
57	Launch Control Center, SLC-4	VAFB	TITAN	3
58	Admin, Titan Technical Support #1	VAFB	TITAN	3
59	Booster Assembly, SRM Seg Assembly /Checkout	VAFB	TITAN	3
60	Maintenance, Missile Service 395D	VAFB	TITAN	3
61	Maintenance, Missile Service Facility, 395D (1522/3)	VAFB	TITAN	3
62	Storage, Booster Support	VAFB	TITAN	3
63	Maintenance, Payload Support, Clean Room	VAFB	TITAN	3
64	Payload Processing Facility, Clean Room	VAFB	TITAN	3
65	Booster Assembly, VAB/HTF, Bay 2	VAFB	TITAN	3
66	Booster Assembly, VAB/HTF, High Bay	VAFB	TITAN	3
67	Admin, VAB/HTF	VAFB	TITAN	3
68	Maintenance, VAB/HTF	VAFB	TITAN	3
69	Launch Pad, SLC-4E, Titan IV	VAFB	TITAN IV	3
70	Payload Support Facility, Bay 2	VAFB	TITAN IV	3
71	Payload Support Facility, Bay 3	VAFB	TITAN IV	3
72	Payload Support Facility, Bay 4	VAFB	TITAN IV	3
73	Payload Support Facility, High Bay	VAFB	TITAN IV	3
74	Telemetry, 8 foot Antenna, VTRS	VAFB	VARIOUS	3
75	Telemetry, Quad Helix Antennas (2), VTRS	VAFB	VARIOUS	3
76	Telemetry, Ground Station, VTRS	VAFB	VARIOUS	3
77	Data, Data Center, Weather Station	VAFB	VARIOUS	3
78	Optical, 7 Inch Cinetel Telescope	VAFB	VARIOUS	3
79	Transportation, Boat Dock	VAFB	VARIOUS	3
80	Waste Treatment Plant, Industrial (337-341)	VAFB	VARIOUS	3
81	Admin, Frequency Monitoring Facility	VAFB	VARIOUS	3
82	Command Transmtr, Cmd Destruct Monitoring	VAFB	VARIOUS	3
83	Frequency, Frequency Monitoring Facility	VAFB	VARIOUS	3
84	Frequency, Radar Monitoring Facility	VAFB	VARIOUS	3

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	PAYLOAD PROCESSING, LAUNCH, AND RECOVERY			
	WORKING GROUP			
	CATEGORY 3 WORKSHEET			
	Facility	Location	Mission	Cat.
85	Radar, Air Route Surveillance	VAFB	VARIOUS	3
86	Radar, Microwave & Radio Facility	VAFB	VARIOUS	3
87	Maintenance, Protective Equipment High Bay	VAFB	VARIOUS	3
88	Maintenance, Protective Equipment Low Bay	VAFB	VARIOUS	3
89	Inflation Shelter, Upper Air Observatory	VAFB	VARIOUS	3
90	Fuels, Hypergolic Stockpile Storage (972-979)	VAFB	VARIOUS	3
91	Frequency, HF Radio Transmitting Site	VAFB	VARIOUS	3
92	Maintenance, Munitions	VAFB	VARIOUS	3
93	Launch Pad, SLC-1E (HAIR Site)	VAFB	VARIOUS	3
94	Laboratory, Precision Measurement Equip. Lab.	VAFB	VARIOUS	3
95	Telemetry, Operational Support and Test Fac	VAFB	VARIOUS	3
96	Inflation Shelter, Upper Air Observatory	VAFB	VARIOUS	3
97	Inflation Shelter, Upper Air Observatory	VAFB	VARIOUS	3
98	Transportation, Airfield, Vandenberg AFB	VAFB	VARIOUS	3
99	Radar, Have Stare	VAFB	VARIOUS	3
100	Maintenance, Refurbishment/Corrosion Control	VAFB	VARIOUS	3
101	Frequency, HF Receiver Site	VAFB	VARIOUS	3
102	Laboratory, Radio Frequency Measurement	VAFB	VARIOUS	3
103	Laboratory, Test Area	VAFB	VARIOUS	3
104	Test Van, RF Measurements	VAFB	VARIOUS	3
105	Laboratory, Radio Frequency Measure., Bay 1	VAFB	VARIOUS	3
106	Laboratory, Radio Frequency Measurement	VAFB	VARIOUS	3
107	Test Van, Command Receiver	VAFB	VARIOUS	3
108	Test Van, Range Safety Test Van	VAFB	VARIOUS	3
109	Test Van, Transponder	VAFB	VARIOUS	3
110	Test Van, Transponder Test Van One	VAFB	VARIOUS	3
111	Laboratory, Calibration Lab	VAFB	VARIOUS	3
112	Maintenance, Component Cleaning Fac., Bay 1	VAFB	VARIOUS	3
113	Maintenance, Component Cleaning Fac, Clean Rm	VAFB	VARIOUS	3
114	Admin, Remote Launch Control	VAFB	VARIOUS	3
115	Radar, 60 Foot TT&C Antenna, VTS	VAFB	VARIOUS	3
116	Maintenance, VTS	VAFB	VARIOUS	3
117	Admin, VTS	VAFB	VARIOUS	3
118	Radar, 10 Meter Antenna, VTS	VAFB	VARIOUS	3
119	Radar, 46 Foot TT&C Antenna, VTS	VAFB	VARIOUS	3
120	Optical, 36 Inch Telescope, Anderson Peak	VAFB	VARIOUS	3
121	Optical, 8 Inch Telescope	VAFB	VARIOUS	3
122	Command Transmitter, Site 6, Cmd Destruct	VAFB	VARIOUS	3
123	Telemetry, Receiving, Communications Relay	VAFB	VARIOUS	3
124	Telemetry, Receiving, Ground Station	VAFB	VARIOUS	3
125	Optical, 10 Inch Telescope	VAFB	VARIOUS	3
126	Optical, 24 Inch Telescope	VAFB	VARIOUS	3

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	Facility	Location	Mission	Cat.
127	Optical, 7 Inch Cinetel Telescope	VAFB	VARIOUS	3
128	ARIA	WPAFB	VARIOUS	3

MANUFACTURING WORKING GROUP

FACILITY FINDINGS

MANUFACTURING WORKING GROUP
INTRODUCTION

The Manufacturing Working Group of the Space Operations Facilities Task Group was chartered to formulate a coordinated national plan for world class launch vehicle and upper stage manufacturing facilities in support of space operations that satisfies the current and projected needs for both commercial and government requirements. More specifically, the team's purpose was to define where consolidation and/or closure of existing facilities is appropriate, determine where United States manufacturing facilities do not meet national space operations needs, and identify world class manufacturing processes and their potential for transfer.

The team took a three phase approach to attain its objective, the first of which was the Data Acquisition Phase. The purpose of this phase was to identify and collate any data that may prove useful during the study. One of the main sources of information was the Mission Model. The Mission Model names a limited number of vehicle types, including: Titan, Atlas, and Delta expendable launch vehicles; Transfer Orbit Stage (TOS), Inertial Upper Stage (IUS), and Centaur upper stages; and the Space Shuttle reusable launch vehicle. The above named are the primary vehicles required to support the nation's space launch needs, and therefore were the focus of the manufacturing team. These vehicles can be further divided into their significant hardware components of liquid engines, solid rocket motors, and propellant tanks and assembly. For a complete matrix identifying all primary facilities studied by the Manufacturing Working Group, reference Figure MFG-1. Additional sources of data included the National Facility Study database, data packs obtained from contractors, and assorted existing studies compiled by the Inspector General, program offices, facility offices, etc. Once this data was collected and analyzed, some preliminary assumptions were made:

1. All facilities supporting the manufacture of liquid engines are contractor owned, contractor operated (COCO). Since the use of these facilities is driven by market forces, it would be inappropriate for the manufacturing team to recommend consolidation or closure options.

2. Solid rocket motor plants are partially COCO and partially Government owned, contractor operated (GOCO); therefore, the industry as a whole should be studied for completeness.

3. Tanks and assembly facilities are primarily COCO; therefore, only GOCO facilities and their complementing COCO facilities should be studied.

The second phase of the analysis plan was the Macro Analysis Phase. In this phase the team compared manufacturing requirements to capabilities. The requirements were derived from the Mission Model by adding the annual launches of each vehicle type, then determining the hardware components required to be produced on an annual basis. These requirements were then contrasted with the maximum annual production rates to ascertain where insufficient or excess capacity exists. For all hardware components the team determined that the capacity exceeds the requirements. The Macro Analysis Phase included recognizing any additional discriminators that would effect team recommendations (e.g., cost, one-of-a-kind, environmental, facility condition, other users, etc.). During this phase it was concluded that in the event a Single Stage to Orbit (SSTO) vehicle was developed, it would have little impact on manufacturing facilities. The SSTO manufacturing requirements would be accommodated with size and capabilities of currently available facilities. From this phase of the study the team developed a short list of facilities with significant potential savings for detailed study in the Micro Analysis phase.

The final phase, or Micro Analysis Phase, focused on a short list of facilities with high potential cost savings from consolidation and/or closure. All facilities studied in this phase were visited by the team to gather detailed data to support team recommendations. The team used this detailed data along with other information obtained in the Data Acquisition Phase to conduct trade studies on parameters such as cost, labor, transportation, facility upgrades, etc. The output from this phase was recommendations for facility consolidation and/or closure.

MANUFACTURING WORKING GROUP
PROGRAM IDENTIFICATION MATRIX

"PRIMARY" PROGRAMS

	ELVs			REUSABLE	UPPER STAGES		
	TITAN	ATLAS	DELTA	SHUTTLE	TOS	IUS	CENTAUR
SOLIDS	• SRMU (FUTURE) • SRM		• 3RD STAGE • STRAP-ON	• ASRM • RSRM	• SRM	• SRM	
LIQUIDS	• LIQUID ENGINE	• ATLAS STAGE • CENTAUR STAGE	• 1ST STAGE • 2ND STAGE	• SSME			• LIQUID ENGINE
T & A	• ASSEMBLY • TANKS	• ASSEMBLY • TANKS	• ASSEMBLY • TANKS	• ORBITER • ET • SRBA	• ASSEMBLY	• ASSEMBLY	• ASSEMBLY • TANKS

FIGURE MFG–1

2-4382-88

MANUFACTURING WORKING GROUP
CATEGORY 1A FACILITY INDEX

FACILITY	LOCATION
Slidell Computer Complex	Slidell, LA
Advanced Solid Rocket Motor	Yellow Creek, MS
AF Plant 19 (GD)	San Diego, CA
AF Plant 70 (Aerojet)	Sacramento, CA
AF Plant 78 (Thiokol)	Brignam City, UT
AF Plant PJKS (Martin Marietta)	Denver, CO

2-456-117

CLOSE SLIDELL COMPUTER COMPLEX (SCC)
SLIDELL, LA

(NASA)

Slidell Computer Complex (SCC) is a dedicated, world class, computer complex operated as a GOCO facility under the direction of MSFC. It currently is dedicated entirely to the External Tank (ET) in support of its production program at the Michoud Assembly Facility (MAF) in New Orleans, LA.

A joint study under the direction of NASA's "Roles and Missions" study and the National Facilities Study was conducted to determine the optimum utilization of this facility in the future. These included utilization of SCC as a central location for consolidation, utilization of MSFC as the location to support ET production utilization of MSFC as the central location for OSF Mainframe ADP consolidation as well as ET production support.

While the payoff potential for the alternatives are almost equivalent, the recommendation falls to the latter given that it effectively consolidates and reduces the facility support required for multiple computer operations. The implementation cost for the move to MSFC has a budget shortfall in FY95 of $10.4M, however, the consolidation results in an annual savings for all subsequent years of approximately $10M.

As noted on the pro's and con's of the facing page, moving the SCC operations to MSFC to support both ET Production and ADP Mainframe Consolidation results in major cost savings, lower overhead burden and consolidates data operations under a single contract at MSFC known as Program Information Systems Management (PrISMS) contract. This contract is in negotiations at the current time. Conversely, this option requires minor facility modifications at MSFC which are approximately $700K and will result in loss of a world class computer complex available to the agency.

For the reasons stated above, this study endorses a move of the SCC activity, including AIM consolidation to MSFC.

Se ˉigure MFG–2

CLOSE SLIDELL COMPUTER COMPLEX (SCC)
SLIDELL, LA.

(NASA)

DESCRIPTION: SCC is a dedicated world class computer facility that is only 33% utilized
Option: Close SCC and relocate External Tank (ET) operations to MSFC

PAYOFF POTENTIAL: $45.5M savings FY95–00

COST SUMMARY:
- Implementation cost: Offset by savings
- Annual savings: Approximately $9M/year; FY97 and subsequent

PROS:
- Major cost savings
- Lower overhead burden
- Consolidates data operations under a single contract (Program Information Systems Management Services (PrISMS) contract)

CONS:
- Facility modifications required (≤ $700K)
- Loss of dedicated world class computer complex to agency

Steps To Make It Happen:
- Develop and implement facilities renovation plan to accommodate computers at MSFC
- MSFC begin planning to relocate SCC's 3090–600 and take on ET support
- MSFC plan to incorporate activity into PrISMS contract
- Develop transition/implementation plans
- Contact GSA regarding steps necessary to close SCC

TASK GROUP RECOMMENDATION: Close SCC and transfer work to MSFC

DATE: 11/16/93 **REV:** **CAT:** 1A

2-5445-109

ADVANCED SOLID ROCKET MOTOR (ASRM) FACILITY
YELLOW CREEK PRODUCTION FACILITY
IUKA, MS.

(NASA)

Construction was terminated on NASA's Advanced Solid Rocket Motor (ASRM) facility in October 1993, when the ASRM Project was cancelled. At that point a sunk cost of $600M in C of F and R&D equipment realized a facility approximately 80% complete. The facility was to be wholly government owned and was to represent state-of-the art capability in the Solid Rocket Motor industry. It is situated in N.E. Mississippi with 1,200 acres of land, water access and 38 buildings totaling 1.2 million square feet.

World class capabilities would include (1) continuous mix propellant operations, (2) soluble core, (3) robotics, and (4) real time radiography.

This study investigated four options for the disposition of the ASRM facility to include (1) terminate work and mothball, (2) produce RSRM nozzles and case refurbishment, (3) complete ASRM facility as a generic, large diameter motor facility to allow competition within the SRM industry and (4) offer the facility to industry/government for non-SRM applications.

The conclusion is that there is no demonstrated need of the ASRM facility to support the mission model, therefore it is recommended that it be terminated and mothballed. The team encourages exploring alternate government and commercial uses of the Yellow Creek facility. If no mission use that is cost effective can be found, then turn the facility over to GSA for disposition. O&M costs are covered by termination budget through December 1994; therefore, disposition must be resolved by then to avoid additional O&M cost being borne.

See Figure MFG–3

ADVANCED SOLID ROCKET MOTOR (ASRM) FACILITY
YELLOW CREEK PRODUCTION FACILITY
IUKA, MS.

(NASA)

DESCRIPTION: Construction of the Advanced Solid Rocket Motor (ASRM) facility was approximately 80% complete when the ASRM project was cancelled in October 1993. This was to be an advanced, state-of-the-art SRM production facility, government owned and operated by Lockheed Missile and Space Corp. (LMSC). It is sited on a 1,200 acre tract with 38 buildings and approximately 1.2 million square feet. Sunk cost for C of F and R&D equipment is estimated at $600M. Option: Terminate construction and mothball facilities

PAYOFF POTENTIAL: N/A

COST SUMMARY: N/A

TASK GROUP RECOMMENDATION: No change required. There is no requirement for the ASRM facility to continue to support the mission model for Shuttle, ELV, or Upper Stages. Therefore, the study recommends no change to the current plan which is to terminate construction. Prior to completing a mothball activity and turning the Yellow Creek facility over to GSA, it is recommended that NASA study alternate uses to determine if a need exists that can capitalize upon this partially completed facility.

DATE: 11/16/93 **REV:** **CAT:** 1A

CONTINUE PLANNED DIVESTITURE OF AF PLANT 19 - GENERAL DYNAMICS, AF PLANT 70 - AEROJET, AF PLANT 78 -THIOKOL, AF PLANT PJKS - MARTIN MARIETTA (NASA, AF, NAVY)

General Dynamics manufactures the Atlas with its Centaur upper stage and the unique Centaur upper stage for the Titan IV at AF Plant 19 and the Kearny Mesa facility. Plant 19, used for the fabrication and assembly of Atlas and Centaur tanks, is co-occupied with a Navy organization (NISEWEST), which was moved from the bay area as a result of a Base Realignment and Closure (BRAC) action. As the Air Force is reducing its ownership of AF plants, action is in process to transfer ownership of the underutilized AF Plant 19 to the Navy. This action will result in a lower total cost to the government because the Navy will not have to find alternate facilities on the open market.

Aerojet has made an offer to purchase the relatively idle facility at AF Plant 70 which is enclosed by Aerojet property. The land, 52 acres and buildings, are part of a two year standing offer which will maintain the defense capability for a five year period after the transfer of ownership. The offer includes the buildings and equipment associated with the Navy facilities located on Aerojet property and their environmental cleanup. The offer under consideration is $11M to purchase less an $8.8M expense for cleanup.

The Air Force business base at AF Plant 78 has decreased to virtually nothing and the predominance of the work is in support of Navy programs. The Navy has declined an offer of ownership and the Air Force is seeking a sale or lease arrangement. As the property is very remote and Thiokol owns the water rights another buyer is unlikely.

AF Plant PJKS, an abbreviation for Peter J. Krause & sons, a 465 acre combination of storage, test and government furnished property is adjoined to the Martin Marietta Waterton facility. The Titan program accounts for 50% of the business volume with contracts extending into 1999. The Aeronautical Systems Center (ASC) has initiated a plan to divest itself of the facility by either sale or closure of the facility by the end of 1995. The proposed action is causing some concern among Government customers. SMC and ASC have begun discussions to allow for an orderly transition for the divestiture action. A negotiated sale to Martin may be possible if the environmental liabilities can adequately be addressed.

The Task Group recommends the Air Force, Aeronautical Systems Center, proceed with the divestiture options to reduce the cost of ownership to the Government.

CONTINUE PLANNED DIVESTITURE OF AF PLANT 19 - GENERAL DYNAMICS, AF PLANT 70 - AEROJET, AF PLANT 78 -THIOKOL, AF PLANT PJKS - MARTIN MARIETTA (NASA, AF, NAVY)

DESCRIPTION: AF Plant 19 - fabrication and assembly of Atlas and Titan Centaur tanks
AF Plant 70 & 78 - solid rocket motor production
AF Plant PJKS - manufacturing & assembly of Titan launch vehicles

Option: Reduce property ownership expense by divestiture, lease or closure

PAYOFF POTENTIAL: Reduced capital type rehabilitation, and O&M costs

COST SUMMARY:

Aerojet offer for	AF Plant 19:	Annual O&M costs	$4.3M	
	AF Plant 70:	AF Plant 70 purchase	$11M	
		Navy line 4 cleanup	-8.8M	$2.2M net
	AF Plant 78:	Annual O&M costs	$7.6M	
	AF Plant PJKS:	Annual O&M costs	$1140M	

PROS:
- Supports AF divestiture actions to reduce cost of ownership
- No impacts to current contracts -- AF Plant 19 and 70
- Maintains capability to support defense requirements and mission model

CONS:
- All properties not readily marketable
- Environmental risk assumption

STEPS TO MAKE IT HAPPEN:
- AF Plant 19 - proceed with transfer to Navy
- AF Plant 7 0 - negotiate sales agreement
- AF Plant 78 - AF seek lease or transfer agreement
- AF Plant PJKS - AF determine closure date and sell or close down

TASK GROUP RECOMMENDATION: AF proceed with divestiture option

DATE: 2/22/94 **REV:** 4/6/94 **CAT:** 1A

RATIONALE TO SUPPORT DIVESTITURE OF FACILITIES

The process used by the Air Force to maintain facilities is to fund capital-type rehabilitation (CTR) and modifications directly via facility contracts. Operations and maintenance expenses are borne by the programs through overhead accounts. It is almost impossible to budget for the CTR expense since the nature of the repairs is unpredictable. Postponing repairs also incurs a mounting liability which impacts an already lean and declining funding level.

Management of facilities contracts requires government resources both at Aeronautical Systems Center and at the contractors' facilities for contract administration. Since the defense business base has declined dramatically the facilities are underutilized for the most part and market forces will motivate contractor ownership to seek alternate uses for the facilities as they diversify. There is no continuing advantage for the Government to retain ownership.

In the case of AF Plant 19, General Dynamics is performing maintenance in exchange for right of use as well as paying rent for the commercial work done in the facility. Since the Navy will not have to build or rent new facilities, this is an effective way to house the function through the life of current contracts (1997).

Aerojet's offer to purchase both the Air Force and Navy Property is good until September 1995 and promises to maintain the necessary defense capability for five years after the sale. Included in the offer is $8.8m to clean up the Navy facilities on the southern edge of the property.

At AF Plant 78, the Air Force work has concluded and the remainder of the work belongs to the Navy. Minuteman facilities have been deactivated and Peacekeeper buildings are selectively being deactivated. The Air Force is considering lease to Thiokol as a sale is unlikely given their declining business base and their reluctance to add to their debt.

2-5413-109

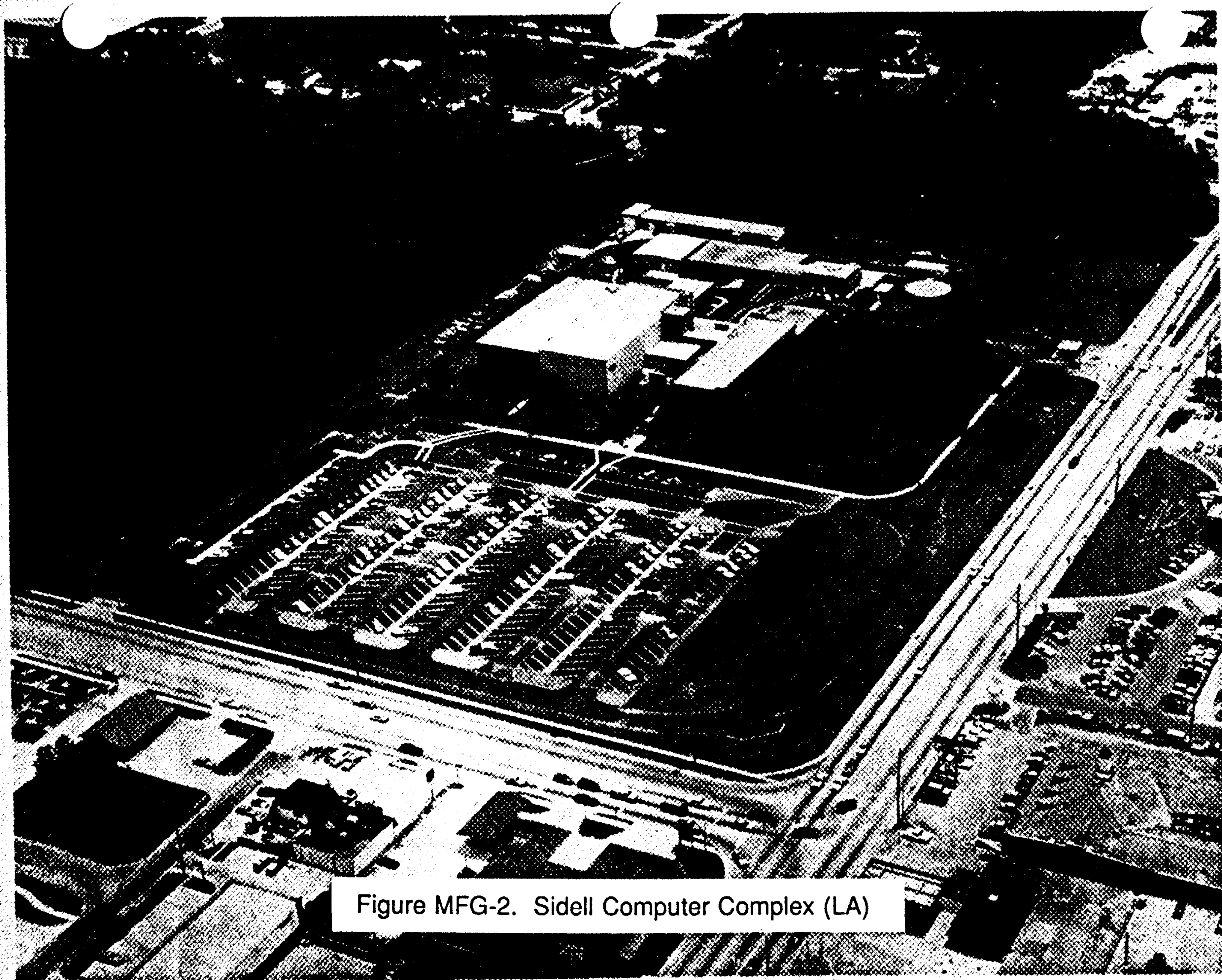


Figure MFG-2. Sidell Computer Complex (LA)

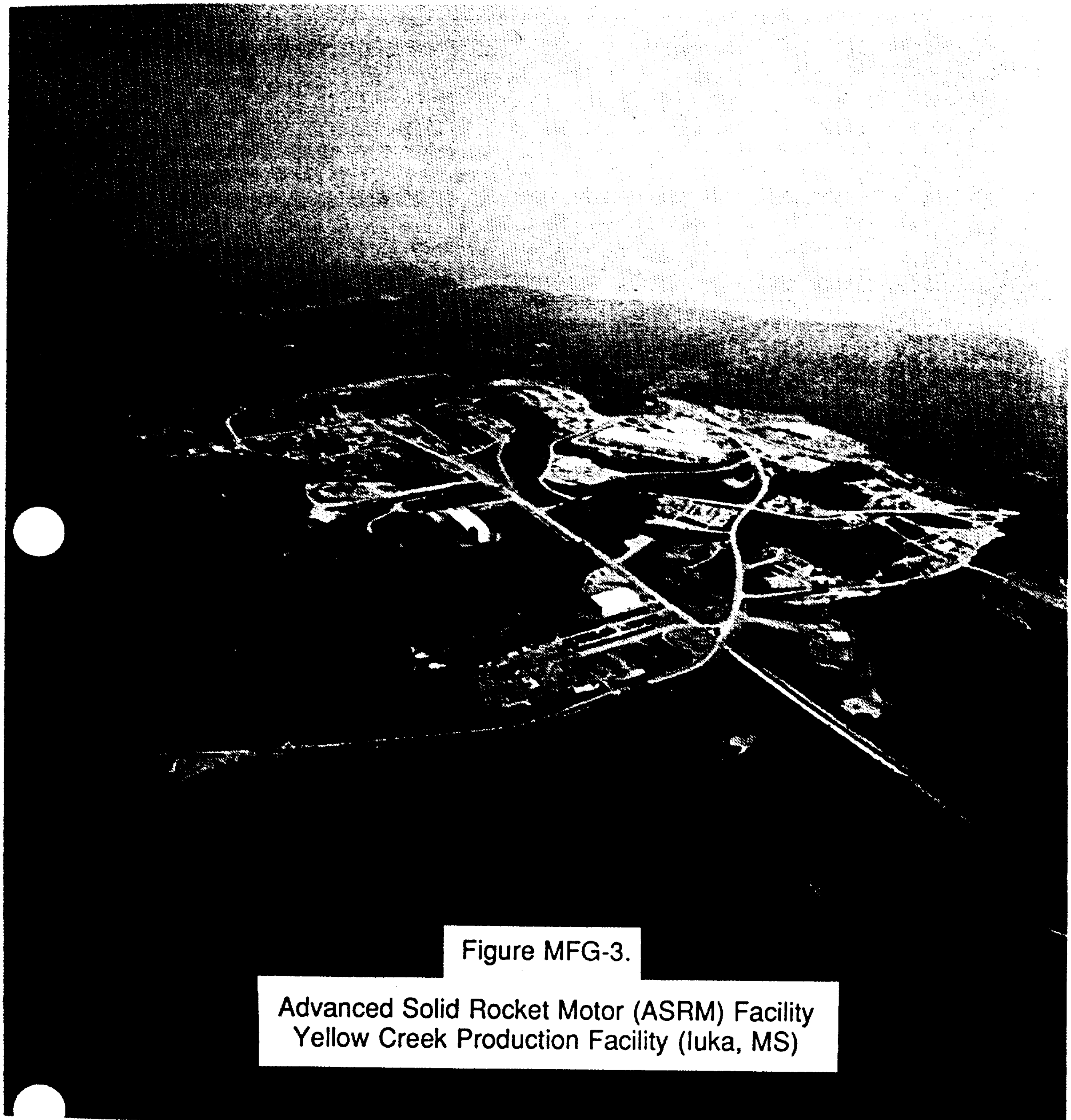


Figure MFG-3.

Advanced Solid Rocket Motor (ASRM) Facility
Yellow Creek Production Facility (Iuka, MS)

MANUFACTURING WORKING GROUP
CATEGORY 1B FACILITY INDEX

FACILITY	LOCATION
Assy and Refurb Facility (ARF)	KSC, FL
Rocketdyne	Canoga Park, CA
Pratt & Whitney	West Palm Beach, FL
Michoud Assy Facility	New Orleans, LA
Chemical Systems Division	San Jose, CA
Naval Ind Reserve Ord Plant	Magna, UT
Thiokol Corp	Elkton, MD
Thiokol Corp	Huntsville, AL

2-457-117

SRB ASSEMBLY & REFURBISHMENT FACILITY (ARF)
KENNEDY SPACE CENTER, FL

(NASA)

The Assembly & Refurbishment Facility (ARF) is the primary facility used at KSC in support of SRB (w/o RSRM) hardware processing. The entire complex is made up of the ARF, Hangar AF, Hangars N and n, the Parachute Refurbishment Facility (PRF), and selected portions of the Vehicle Assembly Building (VAB). In total, the facility provides 540,910 square feet and is maintained in very good condition. The ARF complex was constructed in 1985 with Construction of Facility (C of F) money for approximately $25M and is sustained on an annual facility contract of $2M per year. The facility produces 8 flight sets of hardware per year and is capable of surges to 12 flight sets per year.

World Class capability exists with the Prime Contractor, USBI, in the areas of computerized and automated test and check-out as well as robotic Thermal Protection System (TPS) application and removal.

Based upon the fact that the facilities are fully utilized, have a dedicated mission that supports the Shuttle mission model and is a relatively efficient operation, no change is recommended for the ARF.

SRB ASSEMBLY & REFURBISHMENT FACILITY (ARF)
KENNEDY SPACE CENTER, FL

(NASA)

DESCRIPTION: The Assembly and Refurbishment Facility (ARF) and its supporting facilities are relatively new, state-of-the-art facilities dedicated to the production processing of Solid Rocket Booster (SRB) hardware. The facility is a GOCO facility (operated by USBI), constructed in 1985 at a cost of $25M with a total floor space of approximately 540,910 square feet. Given that the floor space is fully utilized in producing 8 flight sets of hardware per year (although the thruput capacity is 12+ flights per year), and has a dedicated mission that fully supports the Shuttle mission model, the ARF is not recommended for any changes to its current baseline.

TASK GROUP RECOMMENDATION: No change required

DATE: 11/16/93 **REV:** **CAT:** 1B

ROCKETDYNE FACILITY
CANOGA PARK, CA

(NASA, AF)

The Rocketdyne facility is located in Canoga Park, CA, and used in the manufacture of Delta Stage I liquid engines (RS–27 main propulsion and LR101–NA–11 Vernier), Atlas booster engines (MA–5), and the Space Shuttle Main Engine (SSME). Additionally, the facility has world class testing capabilities of Liquid Oxygen/Hydrocarbon engines.

Since the facility is entirely COCO, government recommendations for change are not applicable.

ROCKETDYNE FACILITY
CANOGA PARK, CA

(NASA, AF)

DESCRIPTION: The Rocketdyne facility, located in Canoga Park, California, is used in the manufacture of DELTA Stage I liquid engines, ATLAS booster engines, and the Space Shuttle Main Engine (SSME). The facility is entirely contractor owned and contractor operated (COCO). Government recommendations for change are not applicable.

TASK GROUP RECOMMENDATION: No change required

DATE: 11/19/93 **REV:** **CAT:** 1B

PRATT & WHITNEY FACILITY
WEST PALM BEACH, FL

(NASA, AF)

The Pratt & Whitney facility, located in West Palm Beach, FL, is used in the production of Atlas upper stage (CENTAUR) engines (RL–10), and Space Shuttle Main Engine (SSME) alternate turbopumps. Additionally, the facility has world class capabilities in large scale cryogenic testing, testing of high pressure turbo-machinery, and unique welding.

Since the facility is entirely COCO, government recommendations for change are not applicable.

PRATT & WHITNEY FACILITY
WEST PALM BEACH, FL

(NASA, AF)

DESCRIPTION: The Pratt & Whitney, located in West Palm Beach, Florida, is used in the manufacture of ATLAS upper stage (Centaur) engines and Space Shuttle Main Engine (SSME) alternate turbopumps. The facility is entirely contractor owned and contractor operated (COCO); therefore, government recommendations for change are not applicable.

TASK GROUP RECOMMENDATION: No change required

DATE: 11/19/93 **REV:** **CAT:** 1B

MICHOUD ASSEMBLY FACILITY (MAF)
NEW ORLEANS, LA

(NASA)

The Michoud Assembly Facility (MAF) is a large GOCO facility constructed in the 1960s as NASA's Saturn production site. It is located on an 832 acre site with a total of 4 million square feet of manufacturing and office space. The facility is shared with USDA and other tenants but it is used primarily for production of the Space Shuttle External Tank (ET). The floor space is 93% utilized and currently is baselined to build 8 ETs per year with a maximum rate of 24 ETs per year. The current replacement value of the property is $1.7B.

World Class capability exists at MAF with its prime contractor, Martin Marietta Manned Space Systems in areas associated with fabrication and assembly of large fuel and oxidizer tanks. Specifically, MAF excels at unique aluminum welding, thermal protection system application and transportation capabilities with water access.

While no change is recommended to the current baseline planning it should be noted that the study strongly supports the current position that;

1. The Advanced Solid Rocket Motor (ASRM) Nozzle Facility (within Building 103) is not required for nozzle production in support of the mission model and therefore should not be completed for this purpose.

2. In 1995 an additional 204,500 square feet of manufacturing space and 10,200 square feet of office space will be vacated by the ET project and should be available to other potential users as a means of reducing overhead costs. This, coupled with 250,000 square feet of the ASRM nozzle facility space will provide approximately 500,000 square feet of space for non-ET application.

MICHOUD ASSEMBLY FACILITY (MAF)
NEW ORLEANS, LA.

(NASA)

DESCRIPTION: The Michoud Assembly Facility (MAF) is a major GOCO facility used primarily for the production of the External Tank (ET) for the Space Shuttle. It is located on an 832 acre site with approximately 4 million square feet of manufacturing and office floor space. Prior to the cancellation of the Advanced Solid Rocket Motor (ASRM) a 250,000 square foot facility was being constructed within the main manufacturing building (Bldg 103) for ASRM nozzle fabrication. Currently this facility is approximately 66% complete with $20M invested in a total project of $30M.

TASK GROUP RECOMMENDATION: No change required
This study supports MAF current planning to terminate further construction of ASRM nozzle facility as it is not required to support the shuttle mission model. The study further supports marketing of "vacant" space within MAF of approximately 500,000 square feet for optimal use as space is not required for ET production.

DATE: 11/16/93 **REV:** **CAT:** 1B

UTC/CSD COYOTE CANYON FACILITY
SAN JOSE, CA

(NASA, AF, ARMY, NAVY)

The UTC/CSD facility is located on 5,116 acres near San Jose, CA. There are 130 buildings containing 635,000 square feet of manufacturing/warehouse/laboratory space. The facility has approximately 1,200 employees. Products manufactured include the Titan IV SRM, Titan III SRM (commercial), IUS SRM, shuttle Booster Separation Motors, Trident II Stage 3, and Minuteman III Stage 3. Utilization of the overall solid rocket motor manufacturing capacity is only about 25%.

Since the entire facility is COCO, no government recommendations for change are applicable.

UNITED TECHNOLOGIES CORPORATION/CHEMICAL SYSTEMS DIVISION
SAN JOSE, CA
(NASA, AF, Army, Navy)

DESCRIPTION: The Coyote Canyon facility, located in San Jose, California, is used in the manufacture of solid and hybrid rocket motors, ramjet propulsion systems, and propellant reclamation. The facility is entirely contractor owned and contractor operated (COCO); therefore, government recommendations for change are not applicable.

TASK GROUP RECOMMENDATION: No change required

DATE: 11/19/93 **REV:** **CAT:** 1B

HERCULES AEROSPACE OPERATIONS
MAGNA, UT

(NAVY)

The Hercules Aerospace Company occupies several sites within the state, with the majority located in the Magna area. With the exception of the NIROP, which is owned by the Navy, all other sites are owned or eased by Hercules. Propulsion manufacture is done at plant 1, NIROP, and Bacchus West; Plant 2 in Clearfield is used for the manufacture of filament wound graphite/epoxy motor cases; and Plant 3 produces the basic graphite fiber, composite structures and carbon-carbon nozzles. Specific programs supported in the mission model are the Delta II graphite-epoxy strap-on motors, the upgraded Titan IV solid rocket motors and the Pegasus/Taurus motors.

Bacchus West is a state-of-the-art mix/cast facility that is being used at approximately 30% of capacity. The NINOP is being used for the manufacture of the Trident II second stage with a business base extending through FY 2002. The Navy Strategic Systems Program Office has determined that it would be cost prohibitive to move operations out of the NIROP until production has ceased.

No change is recommended by the Task Group.

HERCULES AEROSPACE OPERATIONS
MAGNA, UT

(NAVY)

DESCRIPTION: The Hercules Aerospace Operations facilities are used for the manufacture of solid rocket motors for the Air Force, Navy, NASA and commercial launch vehicles. Manufacturing is accomplished at several COCO locations within the local area as well as the Naval Industrial Reserve Ordnance Plant (NIROP). The NIROP, a 504 acre GOCO adjacent to the main Hercules facilities, is used in the Trident II SLBM, stage 2 manufacturing process. The Navy Strategic Systems Program Office has identified the need to maintain the NIROP capability through FY 2002.

TASK GROUP RECOMMENDATION: No change required

DATE: 3/22/94 **REV:** **CAT:** 1B

THIOKOL ELKTON DIVISION
(USAF)

The Thiokol Elkton Division is located on 500 acres in Elkton, Maryland, and is used in the manufacture of numerous models of small rocket motors and gas generators. Principal applications for the facility's products are small upper stage motors and orbital insertion motors. Since the facility is entirely contractor owned and operated, government recommendations for change are not applicable.

THIOKOL ELKTON DIVISION
(AF)

DESCRIPTION: A 500 acre facility used for production of solid propellant rocket motors and gas generators.
Option: Status quo

PAYOFF POTENTIAL: N/A

COST SUMMARY: N/A

TASK GROUP RECOMMENDATION: Since the facility is entirely COCO, government recommendations for change are not applicable.

DATE: 2/22/94 **REV:** **CAT:** 1B

THIOKOL CORPORATION HUNTSVILLE DIVISION
REDSTONE ARSENAL, AL

(DOD)

The Thiokol Corporation, Huntsville Division is located entirely on U.S. Army Redstone Arsenal property. Current products manufactured are: Standard Missile, Sidewinder, Hellfire, Castor IVB, Maverick, Patriot, Ageis TOW2. There are two Thiokol plants at Huntsville Division; North Plant (110 acres) and South Plant (162 acres). Both plants have a total of 252 buildings containing 1,019,103 square feet. Of these, 245 buildings (985,701 sq. ft.) are government owned and 7 buildings (33,402 sq. ft.) are Thiokol owned. Approximately 85% of the facility square footage is being utilized. There are approximately 270 Thiokol employees at the Huntsville Division.

World-class facilities and processes exist within Thiokol's Huntsville Division, mainly in computer controlled, automation and robotics of key processes.

Based upon the fact that the facilities are fully utilized; have a dedicated mission, no change is recommended.

THIOKOL CORPORATION HUNTSVILLE DIVISION
REDSTONE ARSENAL, AL

(DOD)

DESCRIPTION: The Thiokol Corporation Huntsville Division's facilities and products have been constructed/manufactured over a period of 5 decades. The facility is GOCO and COCO, even though Thiokol's buildings are located on government owned property. The replacement value of the facilities/equipment is $261.9 million government owned, and $77.1 million Thiokol owned. Within the plant there are facilities with low utilization rates (10-15%); however, 85% of the facilities are being utilized.

TASK GROUP RECOMMENDATION: No change required.

DATE: 4/5/94 **REV:** **CAT:** 1B

MANUFACTURING WORKING GROUP
CATEGORY 2 FACILITY INDEX

FACILITY	LOCATION
AF Plant 42 (Rockwell)	Palmdale, CA
NASA Industrial Plant	Downey, CA

AF PLANT 42 SITE 1 (NASA)
PALMDALE, CA
(NASA, AF)

The Palmdale facility is used for manufacturing, inspection and major modifications of the Shuttle Orbiter vehicles . The traffic model used in this study requires no new Orbiters to be manufactured during the next 30-year period; however, the Shuttle Program Office feels it is necessary to maintain a minimal capability to produce vehicles should an unforeseen need arise. Additionally, Oribter modifications and inspections will be required during this period as the Shuttle fleet ages. A study to consider consolidating activities at the Palmdale and Downey sites and possible alternative locations for accomplishing the Palmdale activities is recommended.

See Figure MFG-4

AF PLANT 42 SITE 1 (NASA)
PALMDALE, CA
(NASA, AF)

DESCRIPTION: Palmdale is a GOCO manufacturing facility used for Orbiter builds/mods/inspections and thermal protection system (TPS) tile and blanket production

Baseline: Continue use as is for Orbiter builds/mods/inspections

Option: Consider consolidation of activities currently performed at Downey and Palmdale and assess cost savings or efficiencies that may be available by using alternative locations.

PAYOFF POTENTIAL: Option: Improved efficiencies and program cost savings

PROS: No near-term need identified in the traffic model for Orbiter production

CONS: Loss of skilled manufacturing workforce
Cost of schedule impact to build another Orbiter

STEPS TO MAKE IT HAPPEN:
Shuttle Program Office should evaluate requirements for continued support of the Shuttle fleet and determine optimum facility usage

TASK GROUP RECOMMENDATION: Continue study to determine the best utilization of AF Plant 42 Site 1 and NASA Industrial Plant (NIP)

DATE: 3/24/94 **REV:** 4/6/94 **CAT:** 2

NASA/ROCKWELL INDUSTRIAL PLANT (NIP)
DOWNEY, CA

(NASA, DOD)

The NIP is a GOCO/COCO plant with NASA owning 166 acres and Rockwell owning 44 acres. Rockwell provides a very wide range of services at this site including Shuttle engineering, manufacturing and testing as well as DOD flight simulations and satellite production. The plant is currently underutilized and, even with the additional DOD work which Rockwell is moving in, will remain under-utilized in the foreseeable future. The Space Shuttle will be NASA's principal launch vehicle into the next century thus requiring continued engineering and manufacturing support currently provided by the Downey facility. In view of continued budget pressures on the Shuttle program, a study to ensure that the Downey and Palmdale facilities are optimally utilized and alternative sites considered is recommended.

See Figure MFG-5

NASA/ROCKWELL INDUSTRIAL PLANT (NIP)
DOWNEY, CA
(NASA, DOD)

DESCRIPTION: GOCO/COCO for Shuttle systems integration, payload integration, and Orbiter production and operations.
Options:

Baseline: Retain NIP with full capacity

Options: Consider consolidation of activities currently performed at Downey and Palmdale and assess cost savings or efficiencies that may be available by using alternative locations.

COST SUMMARY:

Annual Savings: TBD

STEPS TO MAKE IT HAPPEN:

Assess NASA program impacts/ synergism from consolidation/moves.
Assess DOD program impacts
Evaluate desirability of consolidation/moves vs. impact on Rockwell personnel

TASK GROUP RECOMMENDATION: The analysis performed by the NFS indicates that there are potential savings and program improvements which could be gained. Additional studies need to be performed by the Shuttle program office along with DOD before a final determination can be made by the Shuttle program office.

DATE: 3/24/94 **REV:** 4/6/94 **CAT:** 2

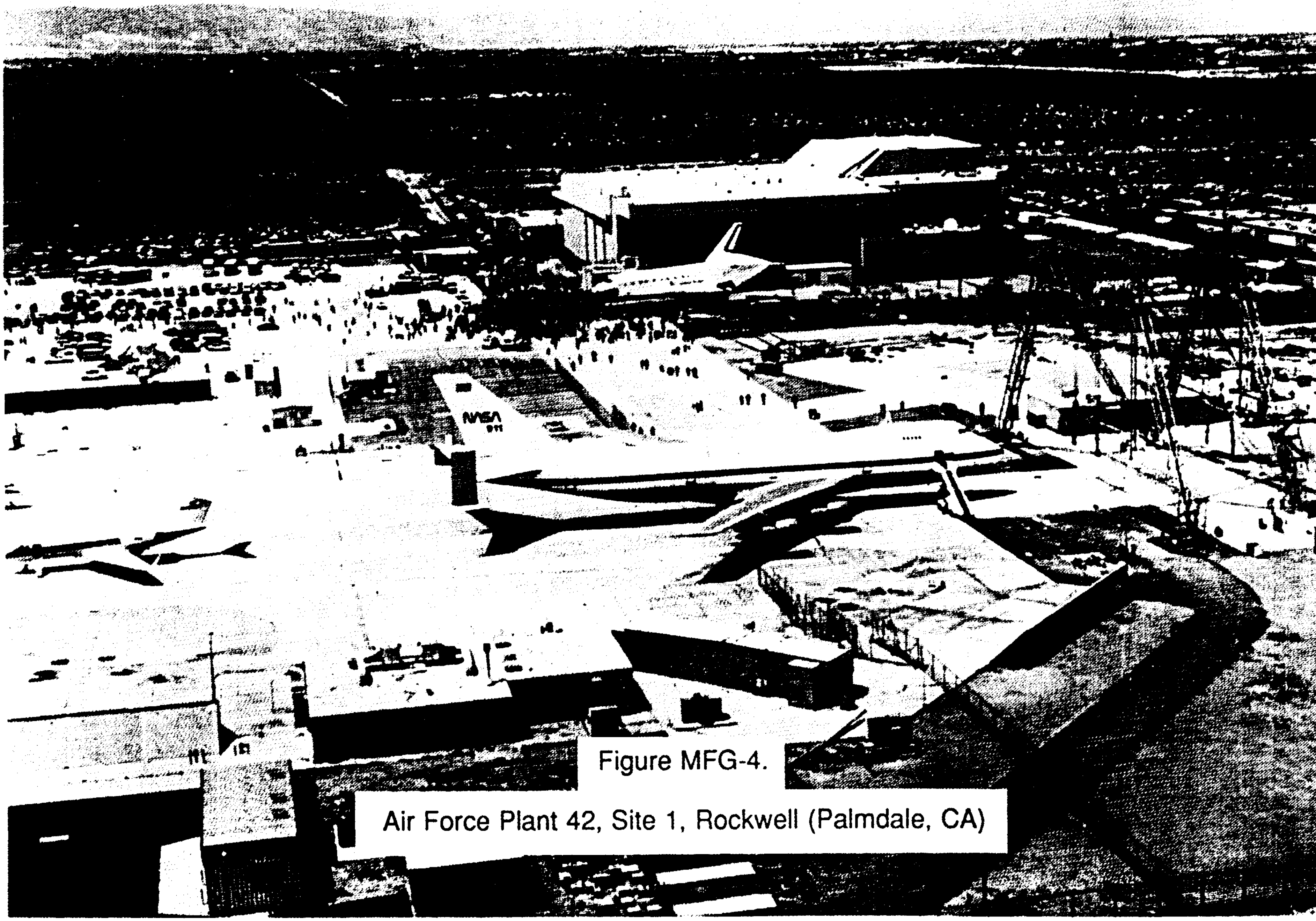


Figure MFG-4.

Air Force Plant 42, Site 1, Rockwell (Palmdale, CA)

Figure MFG-5.

NASA/Rockwell Industrial Plant (NIP) (Downey, CA)

MANUFACTURING WORKING GROUP
CATEGORY 3 FACILITY INDEX

MISSION OPERATIONS AND TRAINING WORKING GROUP

FACILITY FINDINGS

MISSION OPERATIONS AND TRAINING WORKING GROUP INTRODUCTION

The Mission Operations and Training Working Group evaluated 192 facilities in support of the National Facility Study. The survey included facilities located at Kennedy Space Center (KSC), Goddard Space Flight Center (GSFC), Johnson Space Center (JSC), Marshall Space Flight Center (MSFC), Wallops Island, Ames Research Center, White Sands Missile Range (WSMR), Suitland Federal Center, Jet Propulsion Lab, Falcon AFB, Onizuka AFB, Offutt AFB, Fort Irwin, NOAA - Fairbanks, Antigua AS, Ascension AAF, Patrick AFB, and assorted other locations world wide. These facilities were segregated into the following categories: Category 1A: 8 facilities; Category 1B: 70 facilities; Category 2: 22 facilities; Category 3: 89 facilities. The comprehensive evaluation of these facilities follows this introduction.

The Mission Operations and Training Working Group made several observations during the course of the study which were not facility specific, yet seemed to be relevant to the overall study.

1. There is a proliferation of communications and telemetry processing systems for support of "unique" requirements.

2. Roles and missions issues impact the ability to work across organizational lines.

3. All space/satellite control networks currently have very good mission success rates.

4. Excess capacity exists in space/satellite control networks (capacity is defined as facility, equipment, manpower, training and expertise and may vary in its application in the various working group recommendations).

5. There is a proliferation of flight and crew training facilities.

6. Facilities should not be abandoned without funding for stand down/mothball operations.

7. People skills are as important as facilities. Several areas exist where critical skills are possessed by an aging force and few provisions have been made for skill transfer.

8. Adequate operations and management (O&M) recapitalization and technology (R&T) upgrades are planned for some facilities in the 30-year period; other facilities are not as fortunate.

9. No "good" database exists to capture all the Government owned facilities. The current NFS database is an "ad hoc" effort and currently has no method for update or continuation of funding.

10. Mission orbital support requirements, based upon the mission model, appear to be declining in the 30-year period assessed. This decline will only increase the system capacity excess.

11. There is no overarching body to consolidate efforts or track capacity across Government agencies. There are currently many good initiatives to improve facilities and infrastructure, but they are managed on an organization-by-organization basis.
All national needs are being met with existing facilities or with facility projects/improvements that are presently underway.

The team identified the requirement for a new Neutral Buoyancy capability to support the space station. This new facility need is based exclusively on the funding of the space station, and should not be accomplished if the station is not funded by Congress. The two current NASA neutral buoyancy facilities (the Weightless Environment Training Facility (WETF), at JSC and the Neutral Buoyancy System (NBS),at MSFC) are inadequate for full system training. The NBS at MSFC in Huntsville, AL is not colocated with the rest of the high fidelity training at JSC in Houston, TX. This causes the astronauts to travel between MSFC and JSC. However, because of the restriction on flying and diving within 24 hours, there is at least a full day of delay added with each use of the NBS at MSFC. Additionally, because of the depth of the NBS, if the trainees must work below 25 feet (a regular occurrence), an additional 24 hour delay is incurred. The construction of a new neutral buoyancy facility at JSC would consolidate the training, eliminate the travel and its restrictions, and would potentially reduce the overall NASA operating costs of the water tanks.

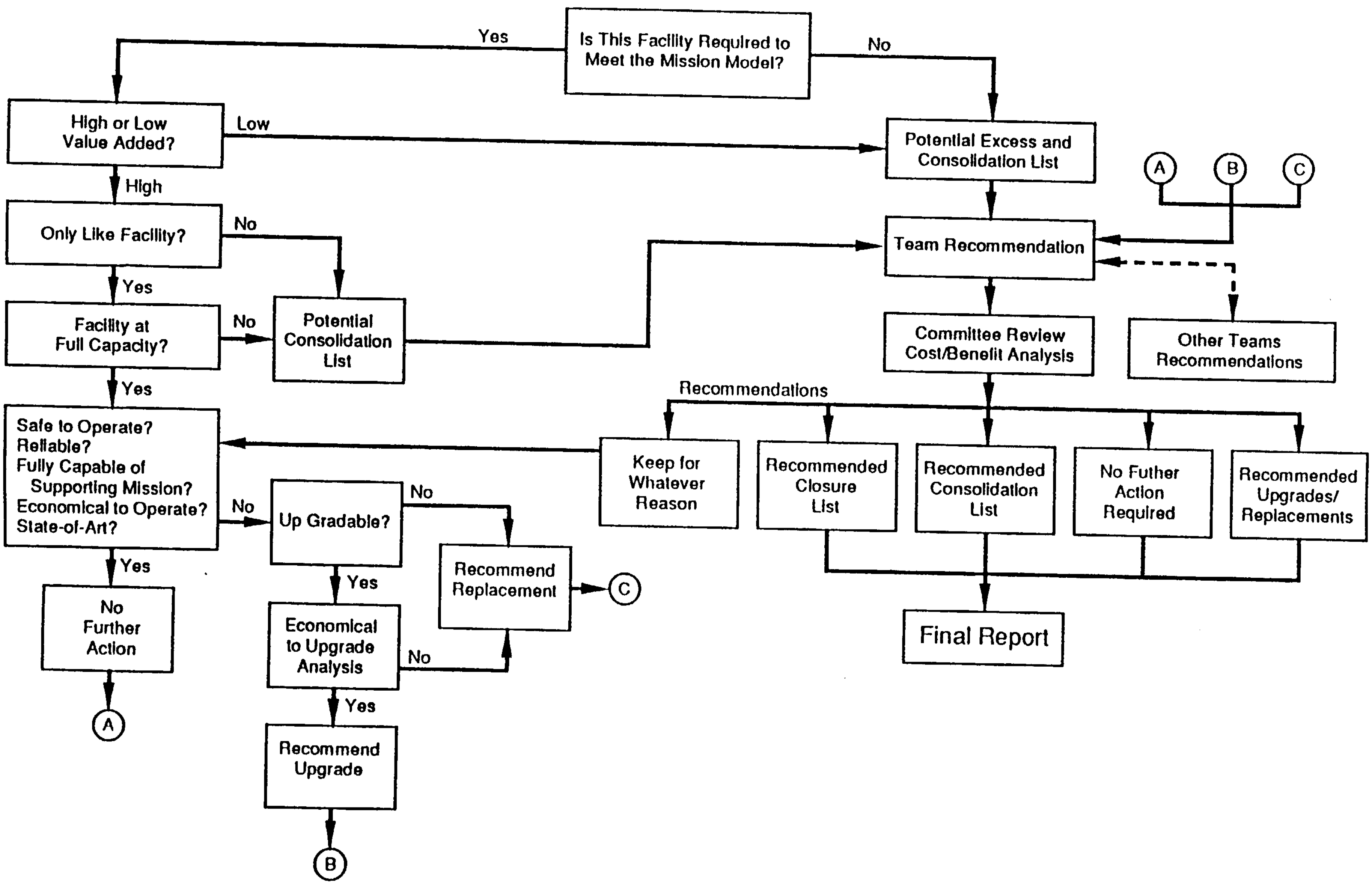
After a cursory review of the Single-Stage-to-Orbit (SSTO) proposed concept, the working group feels that the necessary on-orbit command and control can be satisfied by modifications to the existing control center at JSC. Without more definition concerning flight control requirements for the SSTO, the costs remain unclear.

Category 1A recommendations fall into three major subcategories: endorsement of on-going or budgeted activities, support for a project which is needed to support a planned mission, and finally support for a proposal to transfer facilities from one government agency to another. If all the category 1A recommendations are fully implemented, the savings versus an FY93 baseline could exceed $30M by the year 2000.

Category 2 recommendations will require additional study, however if all of the category 2 recommendations are fully implemented, the total savings versus an FY93 baseline could exceed $250M by the year 2000.

Figure MOT-1 is the detailed decision tree used by this working group.

National Facility Study Decision Tree



M2/MDP/usr/customer/Don Page/Nat Fac Stdy Decision Tree

Figure MOT-1

MISSION OPERATIONS & TRAINING

CATEGORY 1A FACILITY INDEX

FACILITY TITLE	LOCATION
Fairchild Sat Ops Center	Fairchild AFB, WA
DOMSAT Antenna	Fairchild AFB, WA
DOMSAT Antenna	Fairchild AFB, WA
Equipment Shelter	Fairchild AFB, WA
33 foot antenna/Radome Tower-Bldg. 16	Fairchild AFB, WA
33 foot antenna/Radome Tower-Bldg. 19	Fairchild AFB, WA
Multi-Purpose Satellite Operations Center	Offutt AFB, NE
Weightless Environment Training Facility	Johnson Space Center, TX
Neutral Buoyancy Facility, 4705	Marshall Space Flight Center, AL
*AF Space Operations Training	Colorado Springs, CO
*Fort Irwin Antennas	Fort Irwin, CA
Spacelab Data Processing Facility	Goddard Space Flight Center, MD
*Facilities not in data base	

CLOSE DEFENSE METEOROLOGICAL SATELLITE PROGRAM (DMSP) DEDICATED FACILITIES

USSPACECOM/CC has directed the consolidation of dedicated DMSP facilities into the Air Force Satellite Control Network (AFSCN) where possible. The rationale is that the AFSCN provides access to a worldwide system of satellite control antennas and the development/maintenance of antennas and communication networks for exclusive use by a satellite program is not only expensive, but redundant and unnecessary. The DMSP dedicated facilities are Air Force Space Command's (AFSPACECOM) initial consolidation effort.

The Two Operations Centers (at Fairchild AFB, WA and Offutt AFB, NE) are to be consolidated into Falcon AFB, CO. The benefits, other than reduced span of control for the 50 SPW/CC, reside in the reduction of O&M costs for the two closed sites. Since the 50th SPW already has personnel at Falcon AFB operating DMSP satellites, most of the personnel slots at both Fairchild and Offutt could be deleted. The cost of dedicated leased lines will be a substantial savings. In addition, this is a major step toward a consolidated national operational polar-orbiting weather satellite system.

The consolidation effort isn't all roses. There are several issues which mitigate against it. The first is the operational hardware and software for the DMSP constellation. The currently desired approach is to upgradethe operations suite prior to the arrival of DMSP at Falcon. However, if the new operations hardware and software fall behind schedule, or are canceled, the equipment currently at both Offutt and Fairchild will need to be transported to Falcon and hosted there. That will induce both risk and cost. The risk is of equipment breakage and integration. The cost of movement will not be low.

To make this initiative happen, several things need to be worked. First, AFSPACECOM needs to state its position on the need for a backup operational capability, not just for DMSP, but for all the DoD constellations which it supports. Second, emphasis needs to be placed on the upgrade architecture currently planned for Falcon AFB. This activity needs to concentrate on both the plan and the programmatic (money) issues/savings to ensure that the advanced command and control suite is delivered in time to support this transition. Third, the contingency options need to be built so that the current command and control suite can be moved to Falcon, in the event thatthe planned upgrade is not ready in a timely fashion. Finally, an analysis of the crew size required to support the DMSP constellation from Falcon needs to be accomplished. Once that is done, the appropriate manpower actions can occur.

CLOSE DEFENSE METEOROLOGICAL SATELLITE PROGRAM (DMSP) DEDICATED FACILITIES

(AIR FORCE/ NOAA)

DESCRIPTION

DMSP dedicated facilities at Fairchild AFB and Offutt AFB are currently being reviewed for closure and movement of the mission to Falcon AFB.

PAYOFF POTENTIAL

Reduction of O&M costs

Elimination of communications circuit cost to two facilities

COST SUMMARY

IMPLEMENTATION COST	$8.5M
ANNUAL SAVINGS	$2.5M

PROS

- Consolidates activities of three units into one
- Reduces manning and training
- Eliminates redundant facilities
- Eliminates need for additional communication circuits
- First step to a converged national weather network

CONS

- Risk associated with single node ops.
- Risk of shifting control architectures
- Relocation for associated personnel

STEPS TO MAKE IT HAPPEN

- Relocate required equipment and communication circuits
- Identify back-up requirements/plans
- Retrain consolidated crews
- Complete architecture and implement at Falcon AFB

TASK GROUP RECOMMENDATION

- Close DMSP facilities at Fairchild AFB and Offutt AFB.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 1A

NEUTRAL BUOYANCY CONSOLIDATION OPTION

The Neutral Buoyancy Simulator (NBS) at the Marshall Space Flight Center (MSFC) and the Weightless Environment Training Facility (WETF) at the Johnson Space Center (JSC) are designed to provide a simulated zero-gravity environment in which engineers, designers, and astronauts can perform the various phases of space development and Extra Vehicular Activity (EVA) crew training. Without this crew training, mission success would be at increased risk. The Space Station era will require more EVA's than ever attempted in the history of manned space flight. Neither the WETF (78'Lx33'Wx25'D) nor the NBS (75'Dia.x40'D) is sufficiently large to support the current Space Station configuration. Mission risk would increase sharply should the flight crew be trained through only the part-task methods. A new facility, the Neutral Buoyancy Laboratory (NBL) (202'Lx102'Wx40'D) should be built at the Johnson Space Center which provides almost all other flight crew training. Available training days would increase since there are travel safety restrictions for at least 24 hrs. when a crew member has been at depth to avoid the risk of "the bends." On those non-flight days, the crew would be able to train in other simulators located at the Johnson Space Center.

The total costs to build and outfit the NBL is $38M. This would avoid $4.8M in modifications to the NBS and WETF. The annual cost savings after closing the NBS and WETF would be $5M/yr. providing a break even point in FY 2005.

The advantages of the NBL include crew training at one site; reduced travel costs; improved training quality; reduced mock-up costs; reduced suit costs; concurrent set-up and training and future mission flexibility. The disadvantages include the initial cost of NBL construction, and that the NBL would become a single point failure, although that risk is indeed small.

In order to accomplish this task, the NBL must be approved and funded.

See Figures MOT-2 and MOT-3.

NEUTRAL BUOYANCY CONSOLIDATION OPTION
(NASA)

DESCRIPTION

The Neutral Buoyancy Simulator (NBS) and the Weightless Environment Training Facility (WETF) are designed to provide a simulated zero-gravity environment in which engineers, designers, and astronauts can perform the various phases of space development and EVA crew training. Without major modifications, neither the WETF (78Lx33Wx25D) nor the NBS (75ft. dia.x40D) has the size necessary to accomodate the current Space Station configuration. A much larger (102Wx202Lx40D) facility, the Neutral Buoyancy Laboratory, is planned.

PAYOFF POTENTIAL

If NBL is built, the operational costs and crew travel restrictions would be less than the cost of training in the WETF and NBS combined.

COST SUMMARY

IMPLEMENTATION COST	$38M
COST AVOIDANCE	$4.5M (Modifications necessary if NBL not built.)
ANNUAL SAVINGS	FY98 > - Operations costs would be $5M less per year.

PROS

- Crew training conducted at one site.
- Reduced travel costs
- Full simulation vs. part-task training thereby reducing EVA risk.
- Break even point FY 2005
- A single training facility reduces mock-up costs.
- Duplication of suits not required.
- Allows concurrent set-up and training
- Allows flexibility for future mission model changes.

CONS

- Initial cost of NBL
- Single point failure

STEPS TO MAKE IT HAPPEN

- NBL must be approved and funded

TASK GROUP RECOMMENDATION

- Build the NBL to support Space Station training requirements, close the WETF, and discontinue training at the NBS.
- JSC and MSFC agree to accomplish all engineering evaluations in the NBL and close the NBS.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 1A

MOVE AF SPACE OPERATIONS TRAINING (MCC-K) TO FALCON AFB

Currently, all of the initial qualification training for Air Force Space Command (AFSPACECOM) satellite operations occurs in a contractor owned facility in downtown Colorado Springs. In addition, the hardware and software used for training is expensive to operate and frequently not configured to simulate real operating environments, causing confusion and periods of re-training when students arrive in their assigned units. This recommendation suggests that AFSPACECOM satellite operations training for 50 SPW operators be moved to government owned facilities at Falcon AFB, and hosted on a PC or Workstation system to allow quick reconfiguration and reduced operations costs.

The benefits are the elimination of the leased cost of the contractor facility, and the deletion of the O&M costs of the mainframe and its associated software. This allows the operational crews access to the training system (on-site training) for unit qualification training, monthly recurring training (MRT), and launch operations training (rehearsal). The fact that the training would be on-site encourages squadron integrity and increased trainer fidelity (the operational crews and training staffs will demand it if its being used for on-console training). This would also allow the crews undergoing MRT to be out of the operational room and not interfere with day-to-day operation, yet be close in the event of a major satellite anomaly.

The major draw back is that floorspace at Falcon AFB is limited. The PC based training system is currently extant, but looking for a permanent home.

AFSPACECOM needs to review and cancel the contract for the leased facility. Floorspace at Falcon AFB needs to be found to house the Training Squadron. (AFSPACECOM is currently exploring these actions.)

MOVE AF SPACE OPERATIONS TRAINING (MCC-K) TO FALCON AFB
(AIR FORCE)

DESCRIPTION

Initial qualification training for Air Force satellite operators currently occurs in downtown Colorado Springs on a mainframe computer at a leased facility. This recommendation moves training to FAFB and onto a PC based system.

PAYOFF POTENTIAL

- Movement from leased facilities to Government owned
- Closure of main-framed based training simulator

COST SUMMARY

IMPLEMENTATION COST	Funded
ANNUAL SAVINGS	$2M

PROS

- Better operational crew access
- Better squadron integrity based on consolidation
- Small computer simulator reduces costs
- Better response for monthy recurring training & rehearsal training

CONS

- Floor space at Falcon AFB is limited

STEPS TO MAKE IT HAPPEN

- AFSPACECOM is currently taking steps to implement this recommendation

TASK GROUP RECOMMENDATION

- Move AFSPACECOM satellite vehicle initial qualification training from downtown Colorado Springs to Falcon AFB.

DATE: 11-19-93 REV: 1-13-94 CATEGORY 1A

CONSOLIDATION OF SPACELAB DATA PROCESSING CENTER

The Spacelab Data Processing Center (SDPC) is located at the Goddard Space Flight Center (GFSC) in Greenbelt, MD. The facility is responsible for the collection, processing, and distribution for Spacelab experiment data, Shuttle Attached Payloads (AP), and Partial Payloads. The cost of operating the facility is $8M/yr. Since the Payload Operations Control Center (POCC) is located at the Marshall Space Flight Center (MSFC), it is apparent that some cost savings will be realized with consolidation.

Because MSFC already owns the equipment neccessary to perform data processing, there would be no equipment relocation costs.

CONSOLIDATION OF THE SPACELAB DATA PROCESSING CENTER AT MSFC

DESCRIPTION

The Spacelab Data Processing Center (SDPC) at GSFC is the collection, processing, and distribution center for Spacelab experiment data. The SDPC captures and monitors the quality of the data as they are received through the NASCOM system. Duplicate hardware capability exists at MSFC and must be operated in flight support of the Payload Operations Control Center (POCC). Consolidation of the SDPC function at MSFC would greatly reduce operating costs.

PAYOFF POTENTIAL

- The Data Processing at GSFC costs $8M/yr.

COST SUMMARY

IMPLEMENTATION COST	$2.5M
ANNUAL SAVINGS	$5.0M

PROS

- Cost savings.

CONS

- Payback may not hold true if Spacelab is not flown past FY95

STEPS TO MAKE IT HAPPEN

- Spacelab customer concurrence.
- Ensure MSFC/GSFC MOU in place

TASK GROUP RECOMMENDATION

- Based on the mission model, the Spacelab will continue to fly well into the 21st century. Therefore, it is recommended that the data processing and data distribution function be consolidated at MSFC.

DATE: 11-19-93 REV: 3-24-94 CATEGORY 1A

TRANSFER 2 34-METER ANTENNAS FROM ARMY TO NASA

The Army owns two 34-meter antennas and the associated support facilities at Fort Irwin, CA. These antennas are underutilized and the Army has offered to transfer the ownership of these resources to NASA. NASA has been considering the construction of several antennas in this class and roughly in this location. These antennas reflect about an 85% requirements solution for NASA.

The construction of the antennas that NASA would desire has been costed at $28 million. The antennas at Fort Irwin will cost $12 million for refit and upgrade. The net savings is then $16 million. The transfer from the Army to NASA is a no cost transfer. It would provide NASA additional deep space capability sooner than predicted and at lower cost, and would allow the Army to use the equipment on a space-available basis.

On the negative side, the Army retains limited capability to conduct research and this could impact the NASA mission. The principal objection is the apparent duration of the MOU, which is good for a 5 year period, and then renewed if both parties agree.

TRANSFER TWO 34-METER ANTENNAS FROM ARMY TO NASA
(NASA/ARMY)

DESCRIPTION

The Army owns two 34-meter antennas and support facilities at Fort Irwin. The antennas are underutilized and the Army has offered to transfer ownership to NASA for integration into the NASA system. NASA will offer antenna time to the Army. This allows NASA to avoid purchasing antennas to meet the mission model. While not perfect, this transfer translates to an 85% solution.

PAYOFF POTENTIAL

To exploit the equipment no longer needed by the Army Antenna Research System by transferring resources from ARS to NASA.

COST SUMMARY

IMPLEMENTATION COST	$12M
NET SAVINGS to NASA	$16M
COST AVOIDANCE TO ARMY	TBD

PROS

- Uses existing surplus capability
- No-cost transfer to NASA
- Provides NASA additional deep space capability
- Army "plays" on a non-interference basis

CONS

- Any retrofit costs
- Army retains limited capability to conduct research
- NASA required to fund program (O&M)
- Proposed MOU good for 5-year period, then renewed

STEPS TO MAKE IT HAPPEN

- Finalize and sign the Army/NASA MOU for permanent transfer to NASA.

TASK GROUP RECOMMENDATION

- This transfer should occur. We recommend that NASA and the Army work out an MOU which transitions the facility permanently to NASA, not in 5 year intervals.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 1A

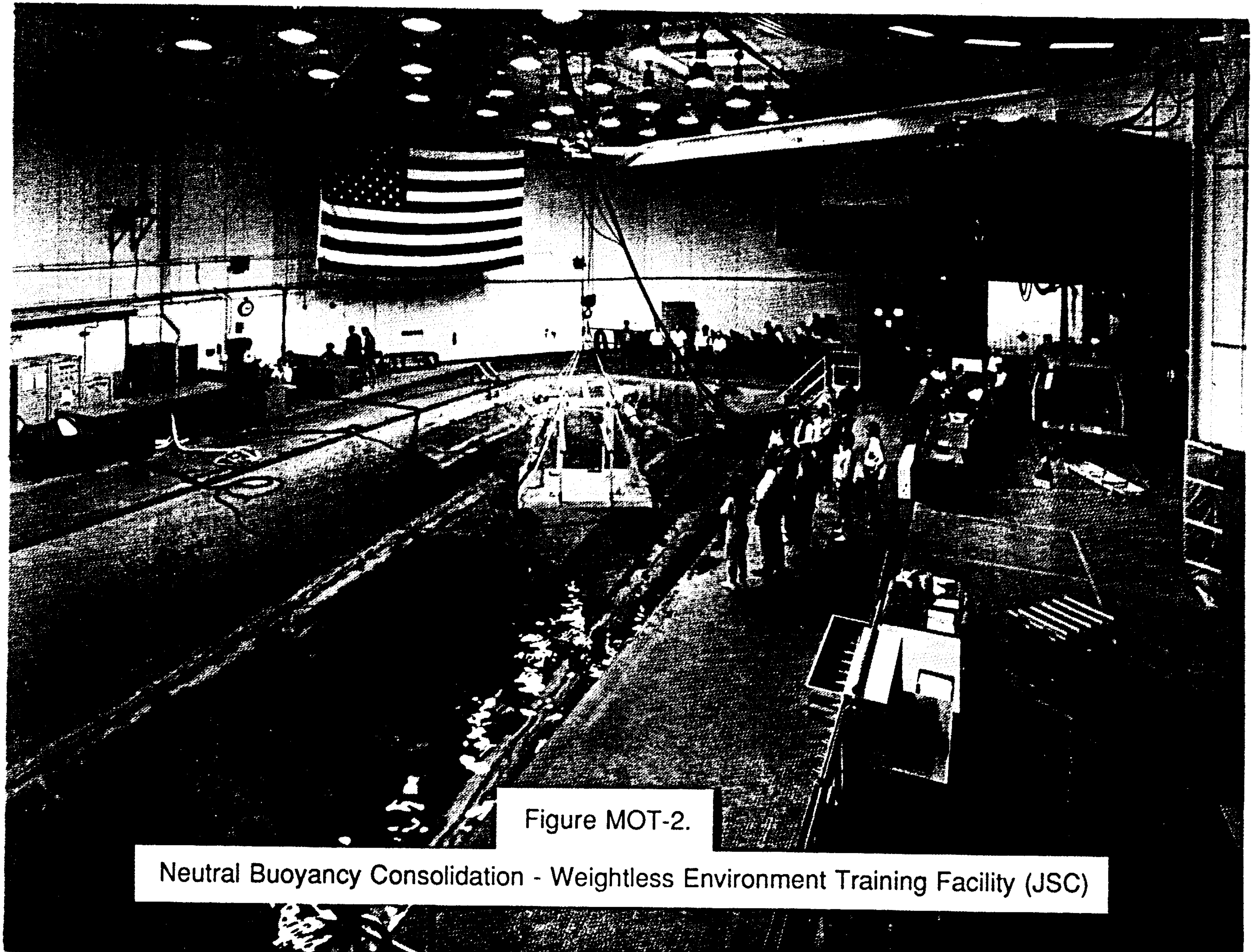
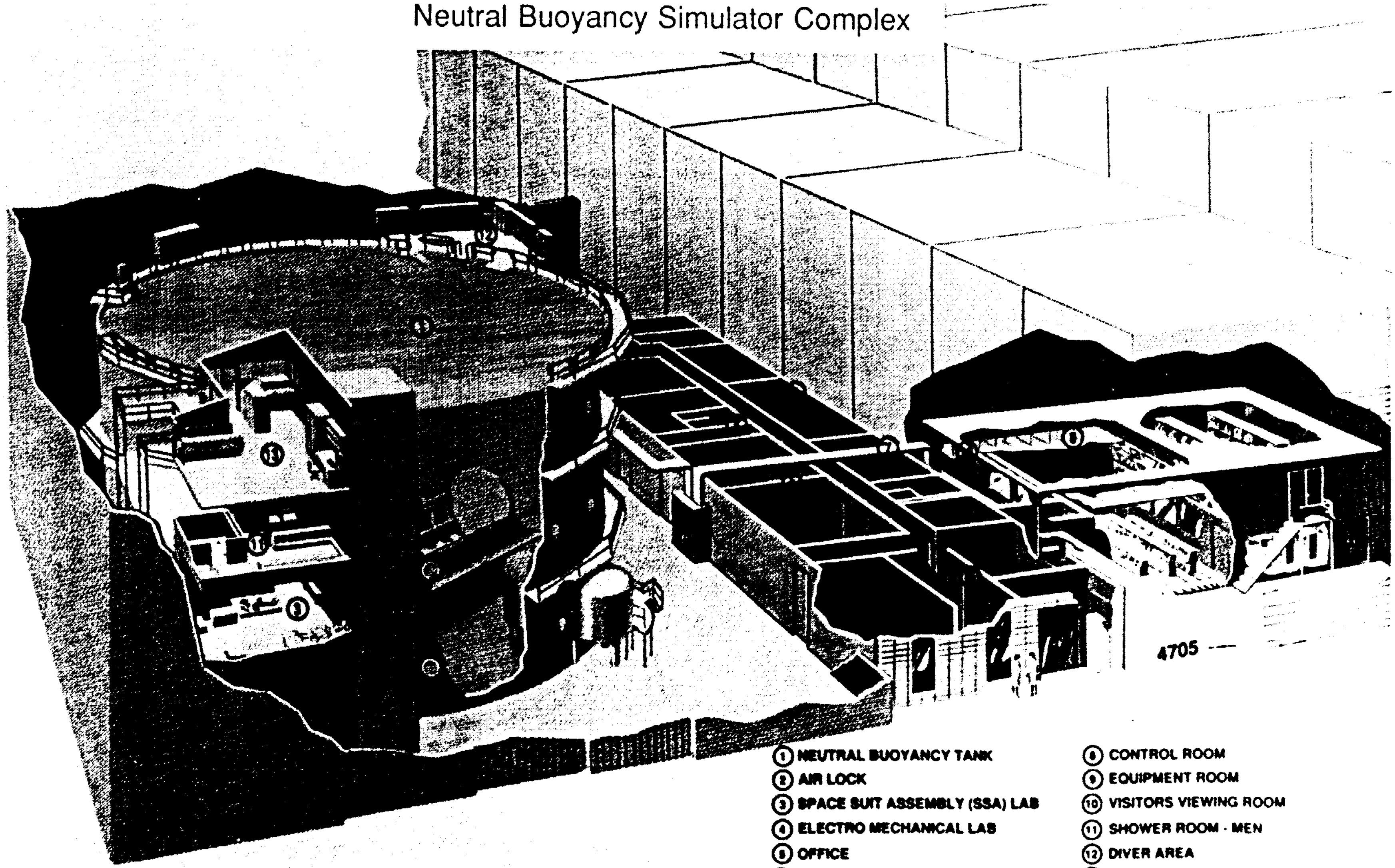


Figure MOT-2.

Neutral Buoyancy Consolidation - Weightless Environment Training Facility (JSC)

Figure MOT-3.

Neutral Buoyancy Simulator Complex



MISSION OPERATIONS & TRAINING

CATEGORY 1B FACILITY INDEX

FACILITY TITLE	LOCATION
Neutral Buoyancy Test Facility (NBTF)	Ames Research Center, CA
Antigua AS Comm/Ops	Antigua AS, West Indies
Antigua AS Radar Bldg.	Antigua AS, West Indies
Antigua AS Telemetry	Antigua AS, West Indies
Ascension Comm/Ops	Ascension AAF, South Atlantic
Ascension AAF Radar 12.15	Ascension AAF, South Atlantic
S-Band Facility	Fairbanks Command & Data Acquisition Station, AK
VLBI Facility (Crustal Dynamics Program)	Fairbanks Command & Data Acquisition Station, AK
Colorado Tracking Station	Falcon AFB, CO
DSCS Terminals, FAFB	Falcon AFB, CO
Communications Control Center	Falcon AFB, CO
GPS Master Control Station (SOC 32)	Falcon AFB, CO
MILSTAR Operations Center	Falcon AFB, CO
Resource Control Center	Falcon AFB, CO
Space Operations Center 33	Falcon AFB, CO
Space Operations Center 34	Falcon AFB, CO
TDRSS Control Center	Goddard Space Flight Center, MD
Control Center Complex/Bldg. 30	Johnson Space Center, TX
Flight Ops, Trainers, Bldg. 4S	Johnson Space Center, TX

MISSION OPERATIONS & TRAINING

CATEGORY 1B FACILITY INDEX

FACILITY TITLE	LOCATION
Control Center Complex/Bldg. 30S	Johnson Space Center, TX
Manipulator Development Facility	Johnson Space Center, TX
Precision Air Bearing Facility, ABF, PGS	Johnson Space Center, TX
Communications Facility, Bldg. 4207	Marshall Space Flight Center, AL
Deployable Test Systems-Transportable	Onizuka AFS, CA
Patrick AFB Radar 0.14	Patrick AFB, FL
7.4 Meter Antenna (East)	Suitland Federal Center, MD
7.4 Meter Antenna (West)	Suitland Federal Center, MD
Geostationary Satellite Operations	Suitland Federal Center, MD
13M Antenna L-Band Receive Facility/Goes-C	Wallops Command & Data Acquisition Station, VA
13M Antenna S-Band Receive Facility/Goes-C	Wallops Command & Data Acquisition Station, VA
13M Antenna Transmit Facility/Goes-C	Wallops Command & Data Acquisition Station, VA
14M Antenna L-Band Receive Facility	Wallops Command & Data Acquisition Station, VA
14M Antenna S-Band Receive Facility	Wallops Command & Data Acquisition Station, VA
14M Antenna Sarsat Receive Facility	Wallops Command & Data Acquisition Station, VA
14M Antenna Transmit Facility	Wallops Command & Data Acquisition Station, VA
14M Antenna VHF Receive Facility	Wallops Command & Data Acquisition Station, VA
18M Antenna L-Band Receive Facility/Goes-A	Wallops Command & Data Acquisition Station, VA
18M Antenna S-Band Receive Facility/Goes-A	Wallops Command & Data Acquisition Station, VA

MISSION OPERATIONS & TRAINING

CATEGORY 1B FACILITY INDEX

FACILITY TITLE	LOCATION
18M Antenna Transmit Facility/Goes-A	Wallops Command & Data Acquisition Station, VA
18M Antenna L-Band Receive Facility/Goes-B	Wallops Command & Data Acquisition Station, VA
18M Antenna S-Band Receive Facility/Goes-B	Wallops Command & Data Acquisition Station, VA
18M Antenna Transmit Facility/Goes-B	Wallops Command & Data Acquisition Station, VA
4 Meter Antenna Transmit Facility-Wallops CDA	Wallops Command & Data Acquisition Station, VA
7M Antenna Receive Facility/Goes-D	Wallops Command & Data Acquisition Station, VA
7M Transmit Facility/Goes-D	Wallops Command & Data Acquisition Station, VA
8 Meter Antenna Receive Facility/Goes-E	Wallops Command & Data Acquisition Station, VA
8 Meter Antenna Transmit Facility/Goes-E	Wallops Command & Data Acquisition Station, VA
GE Earth Station Receive Facility	Wallops Command & Data Acquisition Station, VA
GE Earth Station Transmit Facility	Wallops Command & Data Acquisition Station, VA
IDB Earth Station Receive Facility	Wallops Command & Data Acquisition Station, VA
IDB Earth Station Transmit Facility	Wallops Command & Data Acquisition Station, VA
Goes Operations-Wallops CDA	Wallops Command & Data Acquisition Station, VA
Satan Antenna Transmit Facility	Wallops Command & Data Acquisition Station, VA
Utility Facilities	Wallops Command & Data Acquisition Station, VA
Space Surveillance Station	Saipan, Pacific Ocean
CTA-21	Jet Propulsion Lab, California, CA
DSS 12 Antenna	Jet Propulsion Lab, California, CA

MISSION OPERATIONS & TRAINING

CATEGORY 1B FACILITY INDEX

FACILITY TITLE	LOCATION
DSS 13 Antenna	Jet Propulsion Lab, California, CA
DSS 14 Antenna	Jet Propulsion Lab, California, CA
DSS 15 Antenna	Jet Propulsion Lab, California, CA
DSS 16 Antenna	Jet Propulsion Lab, California, CA
DSS 17 Antenna	Jet Propulsion Lab, California, CA
DSS 42 Antenna	Jet Propulsion Lab, California, CA
DSS 43 Antenna	Jet Propulsion Lab, California, CA
DSS 45 Antenna	Jet Propulsion Lab, California, CA
DSS 46 Antenna	Jet Propulsion Lab, California, CA
DSS 61 Antenna	Jet Propulsion Lab, California, CA
DSS 63 Antenna	Jet Propulsion Lab, California, CA
DSS 65 Antenna	Jet Propulsion Lab, California, CA
DSS 66 Antenna	Jet Propulsion Lab, California, CA

MISSION OPERATIONS FACILITIES
(DOD/NASA/DOC)

The attached list of Mission Operations Facilities are required to meet the mission model both now and in the foreseeable future. Not addressed are issues of standard maintenance or improvements and modernization (I&M) to keep these functions on line as it is expected the facility managers will ensure continued operational capability to match the mission model requirements.

There appears to be no advantages for consolidations or closures of the following facilities:

VLBI Facility, Fairbanks
Milstar Operations Center
SOC 33, Falcon AFB
Science Monitoring Area, JSC
GOES Operations - Wallops
GPS Master Control Station
Resource Control Center
SOC 34, Falcon AFB
Control Center Complex JSC
Manipulator Dvlpmt Facility
Deployable Test System
Utility Facility-Wallops

TRAINING FACILITIES
(NASA)

The attached list of Training Facilities are required to meet the mission model both now and in the foreseeable future. Not addressed are issues of standard maintenance or improvements and modernization (I&M) to keep these functions on line as it is expected the facility managers will ensure continued operational capability to match the mission model requirements.

There appears to be no advantages for consolidations or closures of the following facilities:

Flight Ops, Trainer (JSC)
Precision Air Bearing Facility (JSC)

COMMUNICATIONS FACILITIES
(DOD/NASA)

The attached list of Communications Facilities are required to meet the mission model both now and in the foreseeable future. Not addressed are issues of standard maintenance or improvements and modernization (I&M) to keep these functions on line as it is expected the facility managers will ensure continued operational capability to match the mission model requirements.

There appears to be no advantages for consolidations or closures for the following facilities:

Antigua: Comm/Ops Bldg. 24911, Radar Bldg. 34512,
Ascension: Telemetry Bldg. 35221, Radar Bldg. 16545
Fairbanks: S-Band Facility
Falcon AFB: Colorado Tracking Station, DSCS Terminals, Comm Control Center
Goddard SFC: TDRSS Control Center
Marshall SFC: Comm Facility bldg. 4207
Patrick AFB: Patrick AFB Radar 0.14
Suitland: 7.4M Antenna East, Bldg. 4, 7.4M Antenna West, Bldg. 4
Wallops: 13M Antenna, L/ S-Band Transmit/Receive;
14M Antenna, L/S/VHF/Sarsat Transmit/Receive
18M Antenna, L/S Transmit/Receive - GOES-A/B
4M Antenna Transmit Facility, Wallops CDA
7M Antenna Transmit/Receive - GOES-D
8M Antenna Transmit/Receive - GOES-E
GE Earth Station Transmit/Receive
IDB Earth Station Transmit/Receive
SATAN Antenna Transmit Facility

MISSION OPERATIONS & TRAINING

CATEGORY 2 FACILITY INDEX

Facility Title	Location
*Satellite Control Optimization	Various Locations
Mission Operations Center Facility/Bldg. 28	Goddard Space Flight Center, MD
Space Flight Operations Facility/Bldg. 230	Jet Propulsion Lab, CA
Test Support Complex (SOC 37)	Onizuka AFB, CA
Test Support Complex (SOC 38 & SOC 39)	Onizuka AFB, CA
Space Operations Center 31a	Falcon AFB, CO
Space Operations Center 31b	Falcon AFB, CO
Shuttle Mission Training Facility/Bldg. 5	Johnson Space Center, TX
Science Monitoring Area/Bldg. 36	Johnson Space Center, TX
Payload Crew Training Complex (PCTC)	Marshall Space Flight Center, AL
Shuttle Mission Training Facility/Bldg. 35	Johnson Space Center, TX
Vertical Motion Simulator	Ames Research Center, CA
Systems Engineering Simulator/ Bldg. 16	Johnson Space Center, TX
Mockups and Trainers/Bldg. 9	Johnson Space Center, TX
Multi-use Robotic Manipulator Development Facility	Johnson Space Center, TX
Test Bed & Training Facility	Johnson Space Center, TX
Space Station Verification & Training Facility	Johnson Space Center, TX
SSF Payload Training Complex	Marshall Space Flight Center, AL
*IUE Facility	Wallops Command & Data Acquisition Station, VA
*60' Antenna	Wallops Command & Data Acquisition Station, VA
*Laser Tracking Stations	Various Locations
*Facilities not in database	

OPTIMIZE NETWORKS AND OPERATIONAL CONSOLIDATION

The history of satellite control dates back to the Gary Powers era and the Eisenhower mandate for information. At that time the act of getting a vehicle to space was difficult, let alone making it produce results. When money for space was plentiful, agencies tended to "customize" satellite systems to fit their particular needs. The resulting proliferation of systems which were not interoperable yielded a US Government infrastructure sub-optimized for unified operations.

NASA, Air Force, Navy, Army, DOT, DOC, DOE, and probably others have all participated in satellite operations to some extent, each with its own strengths, weaknesses, and logistic tails.

A unified approach to operations, infrastructure, and procedures will optimize use of existing capabilities, increase efficiency, and save money.

The potential benefits are a savings to all agencies as a result of the following: the current infrastructure provides superb capabilities which could be optimized by a unified approach; cost of independent improvements should be less; operational flexibility to the end users should improve greatly; and because the benefit of multiple use of facilities, the resulting identification of surplus capability and streamlined procedures should produce manpower reductions.

OPTIMIZE NETWORKS AND OPERATIONAL CONSOLIDATION
(AIR FORCE/ARMY/NAVY/NASA/NOAA)

DESCRIPTION

The historic development of independent satellite command and control systems has resulted in reduced interoperability between government-owned systems and less than optimal utilization of resources and facilities. This recommendation focuses on a unified approach to operations and infrastructure.

PAYOFF POTENTIAL

An improvement in operations resulting from optimizing current infrastructure and procedures with potential savings to all agencies.

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Maximum use of current infrastructure
- Cost to implement less than independent efforts.
- Operational flexibility to support end users
- Substantial improvement in "ilities"
- Potential manpower reduction

CONS

- Potential long lead time for study and implementation

STEPS TO MAKE IT HAPPEN

- Study to optimize network including, but not limited to:
  - analysis of current ground stations
  - use of TDRSS to either replace or augment ground stations
  - analysis/review of current comm-link
  - analysis of all current command and control systems
  - policies and procedures governing operations
  - joint approach to moving to alternative frequencies
  - review of interfaces

TASK GROUP RECOMMENDATION

- Initiate a multi-agency task force to study feasibility and establish implementation planning.

DATE: 11-19-93 REV: 1-13-94

CONSOLIDATION OF MULTI-SATELLITE OPERATIONS CENTER AT GSFC

Terminate support of some on-going flights in the multi-satellite operations center at Goddard Space Flight Center (GSFC) including the Cosmic Background Explorer (COBE) and the Earth Radiation Budget Satellite (ERBS). Relocate flight control operations of the Extreme Ultraviolet Explorer (EUVE), the Gamma Ray Observatory (GRO), and the Upper Atmosphere Research Satellite (UARS) into a new consolidated control center based on workstation technology. This would allow, over time, for GSFC to eliminate the large manpower requirements and mission unique control system of older satellite ground control systems and take advantage of the technology offered today saving on manpower costs and unique hardware implementation costs.

The cost savings result from both reducing recurring costs and the elimination of large dedicated staff to operate satellite command and control systems. It appears that the cost of conversion for existing satellite command and control systems is in the range of $2-5M. For each of these converted command and control systems, the savings between FY 1996 and FY 2000 approaches $4M/year.

The advantages of this concept are the elimination of maintenance on older control systems, reduction in the physical space required, reduction of power requirements, and elimination of labor intensive command and control systems.

The disadvantages include the cost to implement, time required before the task can be completed and therefore, delays in realizing cost savings, and possible mission disruption during conversion.

The steps required to make this happen include NASA Headquarters approval to terminate ERBS and COBE, completion of the implementation study, approval of concept, and securing conversion funds.

CONSOLIDATION OF MULTI-SATELLITE OPERATIONS CENTER - GSFC
(NASA)

DESCRIPTION

The Multi-Satellite Operations Center (MSOC) consists of eight computer systems with mid-1970's technology. These antiquated systems are high in maintenance and are labor intensive. The plan is to convert these systems to workstation-based technology. The workstation technology allows more functions to be performed by the Flight Operations Team, reducing the need for support staff currently used in the MSOC systems.

PAYOFF POTENTIAL

- Transfer satellite operation to more efficient and lower cost system.
- Saves recurring operating costs.

COST SUMMARY

IMPLEMENTATION COST	$2-5M subject to conversion approach
ANNUAL SAVINGS	FY96-2000 $4M/year

PROS

- Eliminates maintenance of old systems
- Reduces physical space and power needs
- Eliminates labor intensive system operations

CONS

- Requires purchase of hardware and software
- Benefit not realized until 2 to 3 years after start
- Earlier mission termination will reduce cost reductions
- Possible disruption to mission operations.

STEPS TO MAKE IT HAPPEN

- Provide conversion funding
- Requires HQ approval to terminate ERBS and COBE.

TASK GROUP RECOMMENDATION

- GSFC implement study and complete concept

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

CONSOLIDATION OF THE SPACE FLIGHT OPERATIONS FACILITY SOFTWARE

Numerous mission operation functions such as the Ocean Topography Experiment (TOPEX) and Magellan, among others from the Space Flight Operations Facility, building 230 at the Jet Propulsion Laboratory (JPL) should be transitioned to a new Advanced Multi-Mission Operations System (AMMOS). This new integrated control function consisting of software, hardware, people, procedures, and facilities would allow long-term, deep space flight missions to be controlled with non-mission unique control systems and fewer manpower requirements. The existing SFOF and AMMOS would continue to be located at JPL.

The potential cost savings is estimated at $80-120M between FY 1995 and FY 2000.

There are some unknown hazards involved in this consolidation and these must be addressed for on-going missions such as possible disruption to mission operations during the control system transfers into the new concept. The other large unknown at this time is the implementation costs.

The steps that must be accomplished before this consolidation can be implemented include an in-depth feasibility study to develop conversion and implementation plans as well as to determine the costs necessary to complete the project.

CONSOLIDATION OF SPACE FLIGHT OPERATIONS FACILITY SOFTWARE- JPL
(NASA)

DESCRIPTION

Numerous mission operation functions such as the Ocean Topography Experiment (TOPEX) and Magellan, among others from the Space Flight Operations Facility, building 230 at the Jet Propulsion Laboratory (JPL) should be transitioned to a new Advanced Multi-Mission Operations System (AMMOS). This new integrated control function consisting of hardware, software, people, procedures and facilities would allow long-term, deep space flight missions to be controlled with non-mission unique control systems and fewer manpower requirements. The existing SFOF and AMMOS would continue to be located at JPL.

PAYOFF POTENTIAL

- $80-120M Savings FY95 thru FY2000

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Significant cost savings

CONS

- Possible disruption to mission operations during transfers.
- Implementation cost

STEPS TO MAKE IT HAPPEN

- Continuation of conversion plans and implementation

TASK GROUP RECOMMENDATION

- JPL to conduct a feasibility study as soon as possible to verify both the technical feasibility and cost savings.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

CONSOLIDATE SATELLITE OPERATIONS CENTER (SOC) 37 AT FALCON AFB

Satellite Operations Center 37 is the Research, Development, Test, and Evaluation (RDT&E) facility at Onizuka AFB, CA. The RDT&E community is actively pursuing moving to another location; currently under consideration is Kirtland AFB, NM. HQ AFSPACECOM supports the movement of the RDT&E community; however prefers co-locating the operations community and the RDT&E community at Falcon AFB in hopes of achieving a symbiotic relation. The National Test Facility is located at Falcon AFB, and has floorspace available.

The benefit is the movement from a high cost of operations area (Silicon Valley, CA). Co-location at Falcon AFB is strongly supported by the operations community and communications connectivity is available. The window of opportunity exists to co-locate the RDT&E operations community and to use the RDT&E for prototyping the DOD command, control, and communications architecture.

CONSOLIDATE SOC 37 RDT&E OPERATIONS CENTER WITH OPERATIONS CENTER AT FALCON AFB
(AIR FORCE)

DESCRIPTION

RDT&E operations center resides at SOC 37 at Onizuka AFB. The location should be co-located with the current prime operations center at Falcon AFB.

PAYOFF POTENTIAL

- Annual O&M costs of the SOC and associated personnel

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Satellite & Launch Control Systems Program Office currently looking at an alternative location
- AFSPACECOM strongly desires test community co-location with operations
- Window of opportunity exists to build future DOD satellite command and control node at new RDT&E facility (National Test Facility at FAFB) to prove concept and identify better options.
- Won't have to run additional communications circuits.

CONS

- Depending on location, potentially leaves reduced backup capability for Falcon AFB
- Test and evaluation community desires to re-locate to Kirtland AFB, NM.

STEPS TO MAKE IT HAPPEN

- Air Force Materiel Command (AFMC) and AFSPACECOM initiate dialogue
- Cost/Benefit analysis of Kirtland vs. Falcon

TASK GROUP RECOMMENDATION

- AFMC and AFSPACECOM conduct a study on closure of SOC 37 and relocation of RDT&E activities.

DATE; 11-19-93 REV; 1-13-94

CATEGORY 2

CLOSE BACKUP SATELLITE OPERATIONS CENTER (SOC) 38/39

Space Operations Centers 38 and 39 are located at Onizuka AFB, CA . They serve primarily as backup operations centers for the operations at Falcon AFB, CO. In addition, they also provide primary support to the Integrated Apogee Boost Subsystem (IABS), Skynet, and the Shuttle. Air Force Space Command (AFSPACECOM) has questioned the need for remotely located backup satellite operations. Therefore, the need for these operations centers is in question, particularly if their prime mission can either be done at Falcon AFB, or is no longer needed.

Cu rrently, real-time backup capability is functionally non-existent. Crews from Falcon AFB would need to deploy to Onizuka AFB, with a current database and the correct software package. Since the hardware is not the same in the Onizuka Operations centers as that in the Falcon operations centers, there is likely to be at least a reduction in operations capability, if not a need for integration into the older model hardware (the software is not "portable").

The benefits received from this recommendation are primarily the reduction in O&M and the deletion of a squadron and associated personnel and costs.

The potential disadvantages are the risks of elimination of a DoD backup capability for the Falcon operations centers. Also, the elimination of Air Force Satellite Control Network (AFSCN) support to the Shuttle would add risk.

The AFSCN is a tertiary backup to TDRSS. NASA needs to determine if AFSCN is required and cost effective. NASA then needs to inform AFSPACECOM of its requirements. If the AFSCN access is needed, the NASA Command Formatter (NCF) should be moved to Falcon, and an operations center should be designated for IABS, Skynet, and NASA operations support.

CLOSE BACKUP SATELLITE OPERATIONS CENTER (SOC) 38 AND 39 - ONIZUKA AFB
(AIR FORCE/NASA)

DESCRIPTION

SOC 38 and 39 are two operation centers located at Onizuka AFB which provide back-up operations capability for the operations centers at Falcon AFB.

PAYOFF POTENTIAL

- Annual O&M costs of the SOC and associated personnel

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Current back-up capability extremely limited
- Crews from Falcon AFB would be required to fly out
- Current hardware suite different than that at Falcon AFB
- Database at SOC 38/39 would have to be updated by crews arriving from Falcon AFB.
- Elimination of the cost of operating the back-up squadron

CONS

- Leaves reduced backup capability for Falcon AFB
- DOD support for STS occurs in SOC 38
- If both NASA ground systems and SOC 38 are closed, no backup to TDRSS for STS support.

STEPS TO MAKE IT HAPPEN

- AFSPACECOM/DO direction to do it
- 50th SPW concurrence before DO decision
- Terminate appropriate contracts
- NASA needs to decide if Air Force Satellite Communications Network backup is necessary.
- NASA needs to provide AF its requirements for back-up.
- If back-up requirement exists, NASA Command Formatter needs to be moved to FAFB.

TASK GROUP RECOMMENDATION

- Establish NASA Code O/AFSPACECOM team to study closure plan.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

CONSOLIDATION OF GPS OPERATIONS

The Global Positioning System (GPS) satellite constellation is placed on orbit and handled for major anomalies by Space Operations Center 31 at Falcon AFB. The GPS Master Control Station, also at Falcon AFB, performs satellite payload operations for the GPS constellation.

The current structure divides operational control of individual satellites between two squadrons and increases the risk of error.

The recommendation is to study the convergence of these two units into a single unit which performs all tasks for the GPS constellation.

There should be savings for personnel, logistics, and floorspace. Additionally, it is reasonable to assume that operational efficiencies will be gained.

Certainly there are problems to be overcome. It is apparent that the current GPS antennas are inadequate for the full mission responsibility. The Increase in workload for the MCS would be unbearable under the current command and control architecture, and the consolidation would eliminate emergency backup capability for the MCS.

CONSOLIDATION OF GPS OPERATIONS
(AIR FORCE)

DESCRIPTION

Satellite Operations Center (SOC) 31 at Falcon AFB performs launch and early orbit, anomaly resolution, and routine Global Positioning System (GPS) operations for the satellite bus. The Master Control Station (MCS) performs satellite payload operations for the GPS vehicles.

PAYOFF POTENTIAL

- Partial reduction of SOC manning

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Reduction in personnel
- One squadron responsible for entire satellite constellation
- Reduced O&M costs
- Improved operational coordination

CONS

- Without a change in system architecture, a substantial workload increase for the GPS Master Contol Station.
- Current dedicated antennas are inadequate for full task
- Would eliminate MCS emergency backup capability

STEPS TO MAKE IT HAPPEN

- Provide MCS with access to the AFSCN Command user antennas
- Upgrade the MCS hardware/software suite to an advanced system
- AFSPACECOM/DO concurrence (50th SPW/CC must agree)

TASK GROUP RECOMMENDATION

- AFSPACECOM initiate a study looking at consolidation of the MCS and the GPS portion of SOC 31. The review should include but not be limited to: the MCS access to Air Force Satellite Control Network Antennas; upgraded (DoD standard) hardware and software; and conversion of the GPS dedicated antennas to common use antennas.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

CONSOLIDATION OF DSP OPERATIONS

The Defense Support Program (DSP) satellite constellation is placed on orbit and handled for major anomalies by Space Operations Center 31, 50 SPW, Falcon AFB. Several dedicated DSP Ground Stations (Owned by the 21 SPW), perform satellite payload operations for the DSP constellation.

The current structure divides operational control of individual satellites between two wings and several squadrons and increases the risk of error.

The recommendation is to study the convergence of these units into a single unit which performs all tasks for the DSP constellation.

There should be savings for personnel, logistics, and floorspace. Additionally, it is reasonable to assume that operational efficiencies will be gained.

Certainly there are problems to be overcome. It is apparent that the current DSP antennas are inadequate for the full mission responsibility. The Increase in workload would be difficult under the current command and control architecture, and the consolidation would eliminate emergency backup capability for DSP.

CONSOLIDATION OF DSP OPERATIONS
(AIR FORCE)

DESCRIPTION

Satellite Operations Center (SOC) 31 at Falcon AFB performs launch and early orbit, anomaly resolution, and routine operations for the Defense Satellite Program (DSP) at Falcon AFB. DSP ground station operators perform operations on the satellite payload.

PAYOFF POTENTIAL

- Cost of operating partial SOC and Database maintenance

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Reduction in personnel
- Reduction in database maintenance costs
- Increased floorspace available in Bldg. 400, Falcon AFB
- Consolidation of spacecraft responsibility into one squadron
- Potential reduction in worldwide locations for DSP operations (close 2 squadrons)

CONS

- Increased workload at DSP dedicated ground stations
- Potential increase in squadron size at dedicated locations

STEPS TO MAKE IT HAPPEN

- AFSPACECOM/DO in concert with the 21st and 50th SPW commanders decide.
- Deploy and Advanced Satellite Control System to support the increased workload.
- Deploy an improved communications network to allow dedicated station access to AFSCN antennas world wide.

TASK GROUP RECOMMENDATION

- AFSPACECOM initiate a study looking at consolidation of the DSP Dedicated units and the DSP portion of Soc 31. This study should include but not be limited to: the DSP access to Air Force Satellite Control Network Antennas; upgrade (DoD standard) hardware and software; and conversion of the DSP dedicated antennas to common use antennas.

CONSOLIDATION OF SPACELAB CREW TRAINING FUNCTIONS

Payload and flight crew training currently requires three facilities: The Payload Crew Training Complex (PCTC) at MSFC, which is used to train crew members in hands-on interaction with the Spacelab Command and Data Management Systems; The Spacelab Simulator System (SLS) located in building 5 at JSC, which is a high fidelity, full-scale Spacelab core used to train the crew in all environmental systems; and the Spacelab Mockup located in building 36 at JSC, which is a full-scale Spacelab module that allows the crew to train for life science experiments. In addition, all three facilities provide for engineering evaluation, procedures verification, and on-orbit anomaly resolution.

The potential payoff includes reduced crew travel time and costs; increasing the number of training days available since the flight crews and payload specialists would be trained in only one location; and the reduced maintenance and operations costs if two of these systems could be eliminated.

The cost to upgrade the SLS is approximately $2M plus some unknown mockup relocation costs. This alone would reduce the annual costs of Spacelab operations and training by $1.7/year.

The disadvantages include the costs of relocation and upgrade, and possible disruption to the crew training schedule.

Steps necessary to accomplish this project include resolving roles and mission between JSC and MSFC, completing an implementation and costs study, and the Agency confirming that Spacelab will fly well into the 21st. century.

See Figures MOT-4, MOT-5, and MOT-6.

CONSOLIDATION OF SPACELAB CREW TRAINING FUNCTIONS IN BLDG. 5 AT JSC
(NASA)

DESCRIPTION

The current configuration for Spacelab training consists of 3 facilities: the Payload Crew Training Complex (PCTC) at MSFC, which is used to train crew in hands-on interaction with the Spacelab Command and Data Management Systems; the Spacelab Simulator, housed in Bldg. 5 at JSC, which is a high fidelity, full-scale Spacelab core that is used to train the crew in the use of all environmental systems; and the Spacelab mockup, housed in Bldg. 36 at JSC, which is a full-scale Spacelab module that supports payload hardware integration and crew training for life sciences experiments.
In addition, these facilities provide procedures verification and on-orbit anomaly resolution.

PAYOFF POTENTIAL

- Reduced O&M costs
- Reduced travel costs

COST SUMMARY

- IMPLEMENTATION COST SLS upgrade ($2M) plus unknown mockup relocation costs.
- ANNUAL SAVINGS OR COST $1.7 M savings per year

PROS

- Reduced travel
- Training activities consolidated to one center (JSC)
- Promotes a single customer interface.

CONS

- Possible interruption to the training template
- Cost of SLS upgrade and mockup relocation

STEPS TO MAKE IT HAPPEN

- Agency must decide program status/last flight date.
- Resolve roles and missions with JSC and MSFC

TASK GROUP RECOMMENDATION

- MSFC and JSC complete a cost/benefit analysis to verify the payback period of the project. If Spaclab follows the mission model, consolidate. If Spacelab terminates before 1998, there will be no cost advantage to consolidation.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

CONSOLIDATION OF CREW TRAINING FACILITIES

The training facilities under consideration for consolidation include the Payload Training Facility (PTC) at MSFC, the Shuttle Mission Training Facility (SMTRF) at JSC, and the System Engineering Simulator (SES) at JSC. All of these training facilities provide for engineering evaluations, procedures verification, flight crew training, and on-orbit anomaly resolution for the Space Shuttle Orbiter.

The potential payoff for such a consolidation would come from a reduction in operations and maintenance costs, reduced travel for the flight crew during training periods, and an increase in available training days due to less required travel.

The disadvantages in this option are the high costs of equipment relocation, the required facility modifications, and the changes that would be necessary to the roles and missions of the two Centers.

In order to obtain enough data to ensure that this is an attractive alternative, a detail cost/benefit analysis should be conducted jointly by personnel at the JSC and the MSFC.

CONSOLIDATION OF CREW TRAINING FACILITIES
(NASA)

DESCRIPTION

The training facilities under consideration for consolidation include the Payload Training Facility (PTC) at MSFC, the Shuttle Mission Training Facility (SMTRF), the Space Station Mockup and Training Facility (SSMTF), and the System Engineering Simulator (SES) at JSC. These facilities provide for engineering evaluations, procedures verification, crew training, and on-orbit anomaly resolution.

PAYOFF POTENTIAL

- Reduction of O&M costs
- Reduced travel
- Crew training at one site

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Training located at one center.
- Simulation at one center.

CONS

- Relocation costs would be high
- Major facility modifications required.
- Requires a restructure of roles and missions.

STEPS TO MAKE IT HAPPEN

- A detailed cost/benefit analysis must be conducted.

TASK GROUP RECOMMENDATION

- JSC and MSFC be tasked with conducting such a study.

CLOSE WALLOPS 60 FT. ANTENNA AND IUE FACILITY

The Wallops 60 ft. antenna and IUE facility provide 24 hour per day support to the International Ultraviolet Explorer (IUE) that was launched in January of 1978. The facility includes a small out building that houses the antenna controls and the IUE telemetry receiving equipment.

It would save some operations and maintenance costs if the 60 ft. system were replaced by an automated data acquisition system. Possibly this investment is not a good trade-off since this experiment has been operating for a long time and the remaining life might be short.

A decision not to install an automated data acquisition might be an impact to the FAR Ultraviolet Spectroscopy Explorer (FUSE) but there is some question whether it is in the forecasted budget.

A necessary step to eliminate these facility modifications is a detailed cost/benefit analysis to compare the cost of retaining the 60 ft. antenna and telemetry system vs. installing an automated data acquisition system. The possible impact to FUSE should also be assessed.

CLOSE WALLOPS 60 FT. ANTENNA AND IUE FACILITY
(NASA)

DESCRIPTION

The Wallops 60 ft. antenna and IUE facility provide 24 hour per day support for the International Ultraviolet Explorer, launched in January 1978. The facility includes a small building that houses the antenna controls and IUE telemetry receiving equipment.

PAYOFF POTENTIAL

- O & M cost savings.

COST SUMMARY

IMPLEMENTATION COST	TBD
ANNUAL SAVINGS OR COST	TBD

PROS

- Cost savings and cost avoidance (facilities were scheduled for an upgrade)

CONS

- Possible impact to Far Ultraviolet Spectroscopy Explorer (FUSE)

STEPS TO MAKE IT HAPPEN

- Conduct cost/benefit analysis to compare cost to retain 60ft. antenna vs. automated data acquisition system.

TASK GROUP RECOMMENDATION

- NASA Code O and the responsible satellite organizations conduct a study.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

REDUCE THE NUMBER OF LASER TRACKING STATIONS

NASA's 10 mobile laser tracking facilities are being reviewed for retirement due to fixed GPS receivers ability to do plate tectonic studies. Global Positioning System (GPS) provides the accuracy required for plate tectonics and orbit determination of space vehicles equipped with ranging transponders.

DoD uses Laser Ranging for precise orbit determination and tracking of space vehicles and non-cooperative space debris.

The NASA mobile assets could be used to augment the current DoD fixed facilities, providing a more rapid and responsive space track capability.

REDUCE THE NUMBER OF LASER TRACKING STATIONS
(NASA/AIR FORCE)

DESCRIPTION

Reduce the number of Laser Tracking Stations since the precision geophysical science data and some orbit determination requirements for Earth orbital spacecraft can be met using GPS.

PAYOFF POTENTIAL

O & M cost savings.

COST SUMMARY

IMPLEMENTATION COST	\$5.2M (To improve the reliability of the Calibration and Tracking GPS Network)
ANNUAL SAVINGS	> \$10M

PROS

- Possible cost savings

CONS

- Support to passive spacecraft may be limited

STEPS TO MAKE IT HAPPEN

- Determine which laser stations could be closed without loss of significant geophysical science or orbital determination data.

TASK GROUP RECOMMENDATION

- Establish HQ AFSPACECOM/NASA Code O team to review which sites are needed for Space Object Tracking.

DATE: 11-19-93 REV: 1-13-94

CATEGORY 2

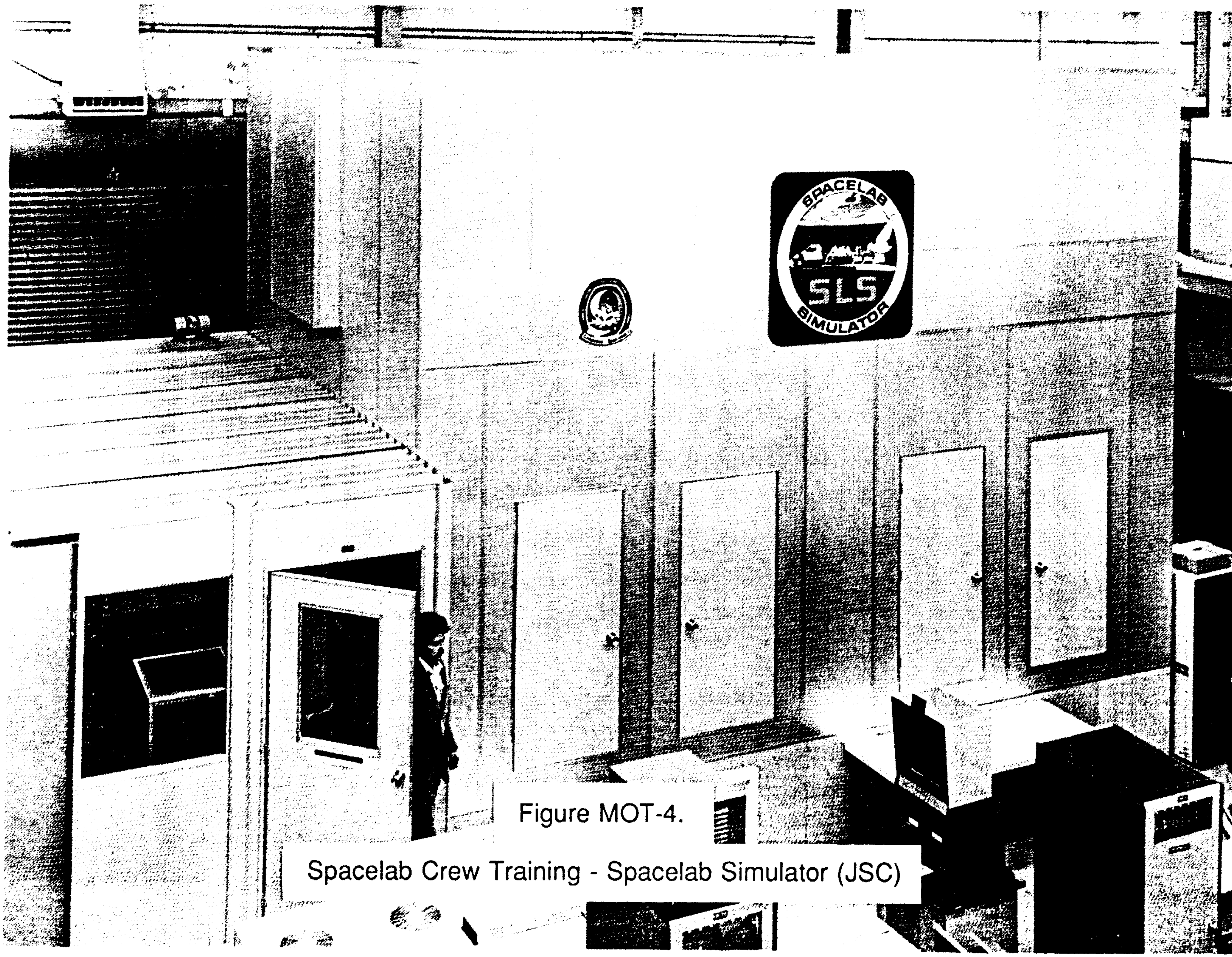


Figure MOT-4.

Spacelab Crew Training - Spacelab Simulator (JSC)

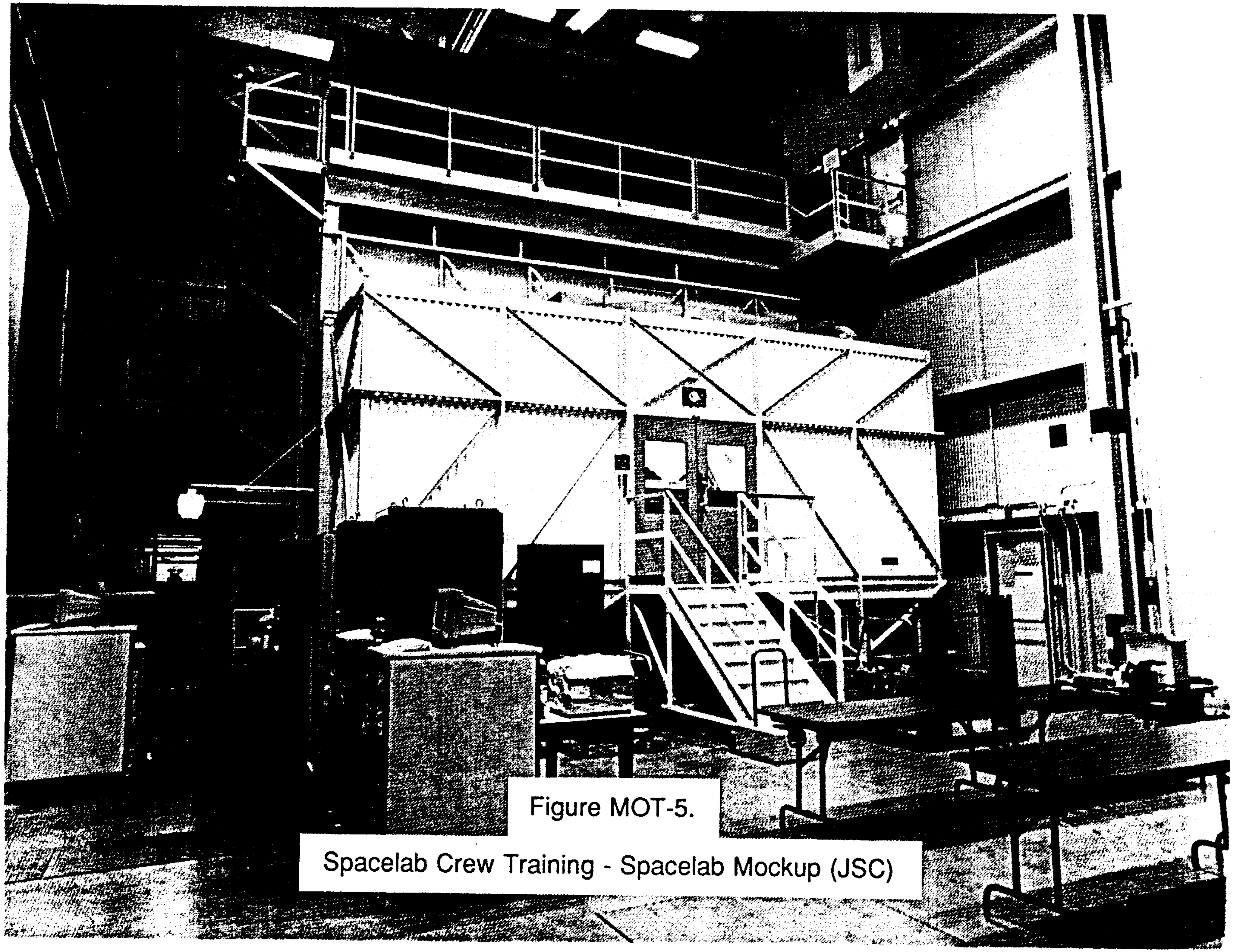


Figure MOT-5.

Spacelab Crew Training - Spacelab Mockup (JSC)

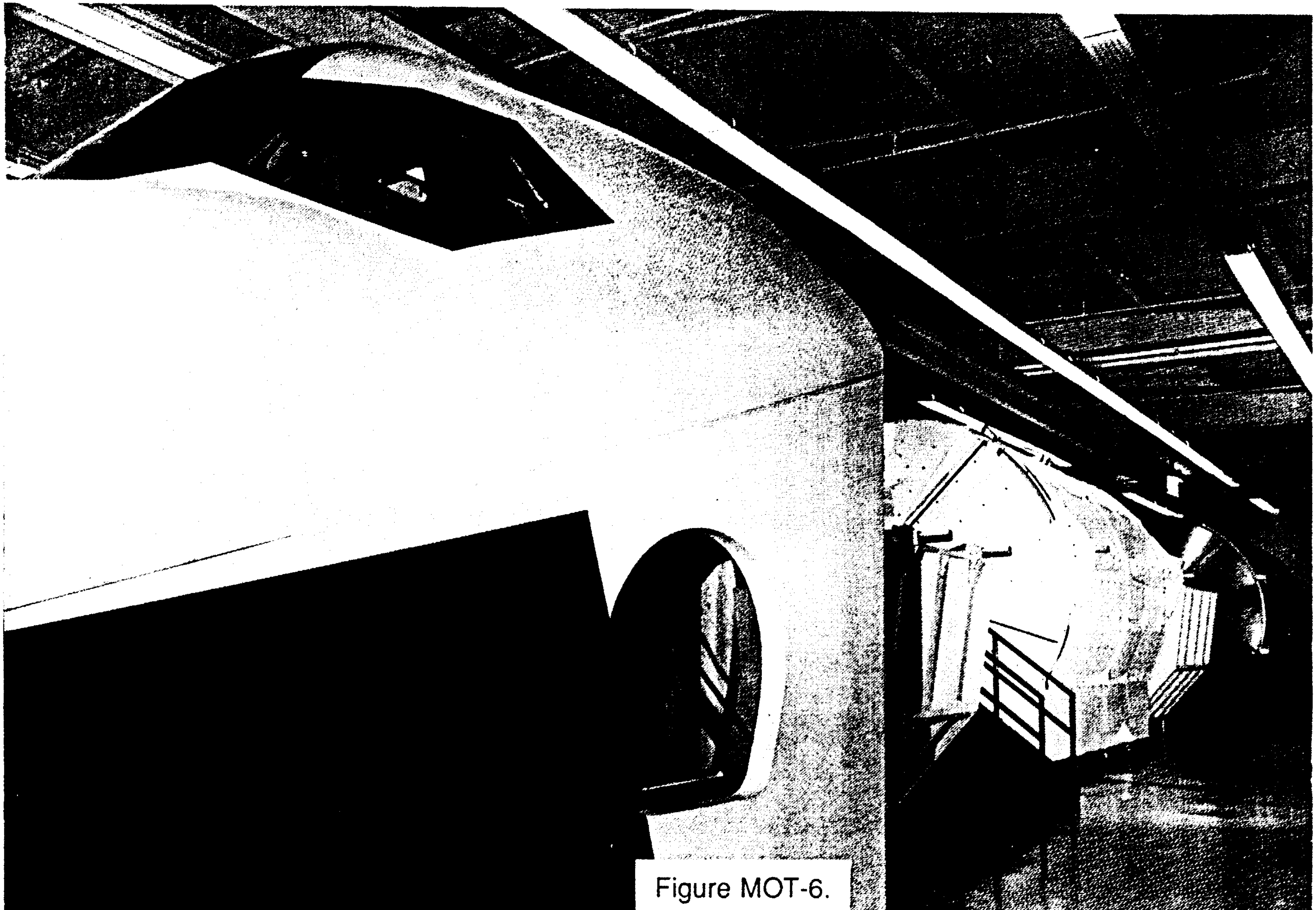


Figure MOT-6.

Payload Crew Training Complex (MSFC)

MISSION OPERATIONS & TRAINING

CATEGORY 3 FACILITY INDEX

FACILITY TITLE	LOCATION
Pioneer Mission Operations Center	Ames Research Center, CA
GPS GA black shelter	Cape Canaveral Eastern Launch Site PCT Station, FL
GPS GA red shelter	Cape Canaveral Eastern Launch Site PCT Station, FL
10 meter GPS Ground Antenna/Bldg. 39761-D	Cape Canaveral Eastern Launch Site PCT Station, FL
10 meter GPS Ground Antenna/Bldg. 2120	Diego Garcia, Indian Ocean
GPS GA black shelter	Diego Garcia, Indian Ocean
TT&C, ARTS & DSIS Area	Diego Garcia, Indian Ocean
12M Antenna L-Band Receive Facility	Fairbanks Command & Data Acquisition Station, AK
12M Antenna S-Band Receive Facility	Fairbanks Command & Data Acquisition Station, AK
12M Antenna VHF Receive Facility	Fairbanks Command & Data Acquisition Station, AK
26M Antenna L-Band Receive Facility	Fairbanks Command & Data Acquisition Station, AK
26M Antenna S-Band Receive Facility	Fairbanks Command & Data Acquisition Station, AK
26M Antenna VHF Receive Facility	Fairbanks Command & Data Acquisition Station, AK
4 Meter Antenna S-Band Transmit Facility	Fairbanks Command & Data Acquisition Station, AK
6M Antenna S-Band Receive Facility	Fairbanks Command & Data Acquisition Station, AK
6M Antenna S-Band Transmit Facility	Fairbanks Command & Data Acquisition Station, AK
Satan Antenna Transmit Facility	Fairbanks Command & Data Acquisition Station, AK
Flight Dynamics Facility	Goddard Space Flight Center, MD
NASA Communications Facility (NASCOM)/ Bldg 28	Goddard Space Flight Center, MD

MISSION OPERATIONS & TRAINING

CATEGORY 3 FACILITY INDEX

FACILITY TITLE	LOCATION
NASA Communications Facility (NASCOM)/ Bldg 14	Goddard Space Flight Center, MD
TT&C, ARTS & DSIS Area	Guam Tracking Station, Pacific
375 Command Transmitter	Guam Tracking Station, Pacific
46' SGLS Antenna	Guam Tracking Station, Pacific
60' SGLS Antenna	Guam Tracking Station, Pacific
AN/FPQ-14	Hawaii Tracking Station, Oahu, HI
DOMSAT Antenna	Hawaii Tracking Station, Oahu, HI
Equipment Building	Hawaii Tracking Station, Oahu, HI
Hawaii Monitor Station	Hawaii Tracking Station, Oahu, HI
TT&C, ARTS & DSIS Area	Hawaii Tracking Station, Oahu, HI
60' SGLS Antenna	Hawaii Tracking Station, Oahu, HI
46' SGLS Antenna	Hawaii Tracking Station, Oahu, HI
Operations Building	Indian Ocean Station, Seychelles, Indian Ocean
Antenna Radome Tower	Indian Ocean Station, Seychelles, Indian Ocean
Communications Center	Indian Ocean Station, Seychelles, Indian Ocean
DSCS Antenna	Indian Ocean Station, Seychelles, Indian Ocean
DSCS Ground Terminal	Indian Ocean Station, Seychelles, Indian Ocean
Mockups and Trainers	Johnson Space Center, TX

MISSION OPERATIONS & TRAINING

CATEGORY 3 FACILITY INDEX

FACILITY TITLE	LOCATION
White Sands Space Harbor	Johnson Space Center, TX
GPS GA Red Equipment	Kwajelein Ground Antenna/Monitor Station (GPS) Pacific
GPS Monitor Station	Kwajalein Ground Antenna/Monitor Station (GPS) Pacific
10 Meter GPS Ground Antenna	Kwajalein Ground Antenna/Monitor Station (GPS) Pacific
GPS GA black shelter	Kwajalein Ground Antenna/Monitor Station (GPS) Pacific
60 foot antenna	New Hampshire Tracking Station, NH
GTE Americom Terminal	New Hampshire Tracking Station, NH
DSCS Terminal	New Hampshire Tracking Station, NH
Main Operations/HQ Bldg	New Hampshire Tracking Station, NH
Satellite Control Station	New Hampshire Tracking Station, NH
Control Center/Bldg. 106	New Hampshire Tracking Station, NH
Control Station/Bldg. 108	New Hampshire Tracking Station, NH
Data Link Antenna	New Hampshire Tracking Station, NH
60' TT&C Antenna	Oakhanger, Borden Hauts, United Kingdom
10 Meter ARTS SGLS Antenna	Oakhanger, Borden Hauts, United Kingdom
DSCS 52' Antenna	Oakhanger, Borden Hauts, United Kingdom

MISSION OPERATIONS & TRAINING

CATEGORY 3 FACILITY INDEX

FACILITY TITLE	LOCATION
DSCS Equipment Shelter	Oakhanger, Borden Hauts, United Kingdom
Operations Room	Oakhanger, Borden Hauts, United Kingdom
ARTS Control & Operations Area	Oakhanger, Borden Hauts, United Kingdom
Agency Data Tape Facility	Onizuka AFS, CA
Polar Satellite Operations/Bldg. 4	Suitland Federal Center, MD
23' SGLS Antenna	Thule Tracking Station, Greenland
Command Transmitter Antenna (DSCS)	Thule Tracking Station, Greenland
TT&C, ARTS & DSIS Area	Thule Tracking Station, Greenland
10 Meter ARTS SGLS Antenna	Thule Tracking Station, Greenland
46' SGLS Antenna	Thule Tracking Station, Greenland
Data Link Terminal Antenna	Thule Tracking Station, Greenland
VAFB, GPS Tracking Site, Bldg. 22104	Vandenberg AFB, CA
Data Link Terminal Antenna	Vandenberg Tracking Station, CA
TT&C, ARTS & DSIS Area	Vandenberg Tracking Station, CA
60 foot SGLS Antenna	Vandenberg Tracking Station, CA
TT&C Antenna Control Equipment	Vandenberg Tracking Station, CA
46' SGLS Antenna	Vandenberg Tracking Station, CA
TT&C Antenna Control Equipment	Vandenberg Tracking Station, CA
26M Antenna L-Band Receive Facility	Wallops Command & Data Acquisition Station, VA
26M Antenna S-Band Receive Facility	Wallops Command & Data Acquisition Station, VA

MISSION OPERATIONS & TRAINING

CATEGORY 3 FACILITY INDEX

FACILITY TITLE	LOCATION
26M Antenna VHF Receive Facility	Wallops Command & Data Acquisition Station, VA
Polar Satellite Operations-Wallops CDA	Wallops Command & Data Acquisition Station, VA
Master Timing Station (MTS)	Wallops Flight Facility-Goddard Space Flight Center, VA
Mobile Telemetry MT1	Wallops Flight Facility-Goddard Space Flight Center, VA
Mobile Telemetry MT2	Wallops Flight Facility-Goddard Space Flight Center, VA
Mobile Telemetry MT3	Wallops Flight Facility-Goddard Space Flight Center, VA
Orbital Tracking Facility 7.3 Systems	Wallops Flight Facility-Goddard Space Flight Center, VA
Orbital Tracking Facility ADAS	Wallops Flight Facility-Goddard Space Flight Center, VA
Orbital Tracking Facility OTS1	Wallops Flight Facility-Goddard Space Flight Center, VA
Orbital Tracking Facility OTS2	Wallops Flight Facility-Goddard Space Flight Center, VA

MISSION OPERATIONS & TRAINING

CATEGORY 3 FACILITY INDEX

FACILITY TITLE	LOCATION
Orbital Tracking Facility SATAN RX	Wallops Flight Facility-Goddard Space Flight Center, VA
Orbital Tracking Facility TDMA	Wallops Flight Facility-Goddard Space Flight Center, VA
Orbital Tracking Facility TOMS 24'	Wallops Flight Facility-Goddard Space Flight Center, VA
R.F. Communications Receiver Site	Wallops Flight Facility-Goddard Space Flight Center, VA
Telemetry Systems (Fixed)	Wallops Flight Facility-Goddard Space Flight Center, VA
Transportable Orbital Tracking System (TOTS)	Wallops Flight Facility-Goddard Space Flight Center, VA

POLICY AND STRATEGY WORKING GROUP

FINDINGS

POLICY AND STRATEGY WORKING GROUP

CATEGORY 1 A RECOMMENDATIONS: NONE

CATEGORY 1B RECOMMENDATIONS: NONE

CATEGORY 2 RECOMMENDATIONS:

REVIEW AND RATIONALIZE U.S. SPACE FUNCTIONS AND RESPONSIBILITIES

ESTABLISH UNIFORM PRICING POLICY

CATEGORY 3 RECOMMENDATIONS: NONE

REVIEW AND RATIONALIZE
U.S. SPACE FUNCTIONS AND RESPONSIBILITIES
DoD, NASA, DOE, DOT, DOC

Space activities and resources are currently distributed across NASA, DoD, DOE, DOT, and DOC. This is the result of historical factors, which need to be reexamined in light of current political and fiscal realities. These new realities include, for example, the changed international political environment as a result of the end of the Cold War, the development of relations with individual countries from the former Soviet Union, the growing emphasis on environmental monitoring activities from space, the proliferation of non-U.S. remote space-based sensing capabilities, and the drawdown in resources to both military and civil space programs.

The scope of such a review could include a review and recommendations on the functions and responsibilities of:

(1) major organizations within each agency; For example, this would include the respective functions of major Centers within NASA and a review of the respective operations responsibilities among DoD elements involved in space-related activity.

(2) agencies as a whole; This would include the respective responsibilities and activities among the DoD, NASA, and DOE, as entities.

(3) the respective responsibilities of government and private industry. For example, what should be provided by Federal or state government as infrastructure or other required activities and services and what should be provided by the private sector.

Such an effort could provide a basis for significant reductions in facilities, people, and programs by decreasing the space mission overlap within agencies, between agencies, and through clarifying the respective roles for government and private organizations. Such a study would require ten persons or more for approximately six months; associated costs of the proposed study cannot be estimated at this time. Costs to implement the recommendations from such a review and the savings that would result are not known, but would be necessary elements to be estimated during the course of the review.

Findings :

- Similar space-related activities are occurring within multiple agencies. These include, for example space-related R&D, launch-related R&D and operations, and on-orbit operations.

- Efforts to coordinate space-related activities within and across agencies are underway, but may not reflect a national perspective on right-sizing government facilities or capabilities. There is a widespread recognition that space-related activities need to become more efficient, but actions typically reflect local perspectives, priorities, and approaches, rather than any broadly coordinated strategy.

- Without changes in Agency functions and responsibilities, working groups composed of field representatives and mid-level headquarters personnel will continue to propose recommendations that cannot, in general, address visionary changes nor major consolidation changes. Without direction from the most senior level, organizations do not naturally recommend the demise of their own functions, organizations, and responsibilities, even though such actions could be in the b ational interest.

REVIEW AND RATIONALIZE
U.S. SPACE FUNCTIONS AND RESPONSIBILITIES
(DoD, NASA, DoE, DoT, DoC)

DESCRIPTION: Space activities and resources are currently distributed across NASA, DoD, DoE, DoT, and DoC. This is the result of historical factors, which need to be reexamined in light of current political and fiscal realities. The scope of such a review would need to include functions and responsibilities of (1) major organizations within each agency; (2) agencies as a whole; and (3) the respective responsibilities of government and private industry.

PAYOFF POTENTIAL: Could provide a basis for significant reductions in facilities, people, and programs by decreasing the space mission overlap within agencies, between agencies, and through clarifying the respective roles for government and private organizations.

COST SUMMARY:
Study Cost: TBD
Implementation Cost: TBD
Annual Savings: TBD

FINDINGS:

- Similar space-related activities are occurring within multiple agencies (R&D, launch, and operations)

- Efforts to coordinate space-related activities within and across agencies are underway, but may not reflect a national perspective on right-sizing government facilities or capabilities

- Without changes in Agency functions and responsibilities, working group recommendations cannot, in general, address visionary and major consolidation changes

REVIEW AND RATIONALIZE U.S. SPACE FUNCTIONS AND RESPONSIBILITIES CONT'D

The reasons for such an effort include:

- Clarification of space related responsibilities would provide a broader base for precluding unwarranted duplication of space facilities and for making recommendations for major space facility improvement, consolidations and closures.

- Facilities should follow functional responsibility, especially investment in new facilities

- Recommendations on use of government facilities by the private sector need to reflect the respective functions of government and industry

- Clarification of responsibilities could result in major consolidations and other changes in government space activities (e.g., responsibilities for: space launch R&D; space launch operations; and on-orbit spacecraft operations)

- Clarification of responsibilities between government and private industry together with a clear national vision and strategy for space could accelerate commercialization of space by channeling private investment and intellectual assets into more viable activities

- If the Agencies do not take the initiative, there is Congressional interest and preliminary actions in motion to dictate solutions (e.g., launch and acquisition)

- It is required if the US is to have a "world-class" space program, given the current budget environments. Although the US is the only nation to have put men on the moon, if we do not get its space organization and program in order, other nations will continue to surpass us in commercial, civil, and military space capabilities.

The downside of this effort includes:

- There may be limited incentive within various agencies to give up functions and responsibilities; therefore, this may be too hard to accomplish or do very well.

- Such a review may be impossible for agencies to initiate on their own, independent of directed budget cuts because of concern that any consolidation recommendations will take away agency flexibility to respond to existing cuts

- Recommendations for organizational change based on improved efficiencies and savings can result in self-fulfilling budget cuts; in the current environment, efficiencies will merely mean we get a smaller resource base to reduce further.

- A recommendation to conduct a functions and responsibilities review could be used as an excuse to delay implementation of other National Facility Study recommendations. .

- A redefinition of agency functions and responsibilities could have direct impact on Congressional committee responsibilities which might be resisted within Congress to the extent that implementation of ised agency functions and responsibilities would ultimately be defeated.

REVIEW AND RATIONALIZE U.S. SPACE FUNCTIONS AND RESPONSIBILITIES
(CONT'D)

PROs:

- Broader base for precluding unwarranted duplication of space facilities and for making recommendations for improvements, consolidations, and closures.
- Facilities should follow functional responsibility, especially investment in new facilities
- Recommendations on use of government facilities by the private sector need to reflect the respective functions of government and industry
- Clarification of responsibilities could result in major consolidations and reductions in both facilities and personnel
- Accelerate commercialization of space by channeling private investment and intellectual assets into more viable activities
- Congressional interest and preliminary actions in motion to dictate solutions
- Required if the US is to have a "world-class" space program, given the budget environment

CONs:

- Limited incentive within various agencies to give up functions and responsibilities
- Such a review may be impossible for agencies to initiate on their own, independent of directed budget cuts
- Recommendations for organizational change based on improved efficiencies and savings can result in self-fulfilling budget cuts
- Could be used as an excuse to delay implementation of other National Facility Study recommendations
- Could directly impact Congressional committee responsibilities which might defeat implementation of revised functions and responsibilities

REVIEW AND RATIONALIZE U.S. SPACE FUNCTIONS AND RESPONSIBILITIES CONT'D

To accomplish the proposed effort, several steps are recommended. They include actions to obtain Agency head sponsorship, inclusion of other Congressional direction, definition of the parameters of the study, and study team membership. The recommendation is to:

- Seek Secretary of Defense, Secretary of Energy, and NASA Administrator sponsorship of a review of agency functions and responsibilities

- Incorporate the Administration response to Congress' direction to reorganize DoD space responsibilities into this broader, cross-agency analysis. The FY94 DoD Appropriation Report requested an implementation plan for several changes in space organization and management; and the FY94 DoD Authorization Bill also directed the creation of a Commission on Roles and Missions of the Armed Forces to review and make recommendations on the allocations among the Armed Forces of roles, missions, and functions. One of the potential areas for review will be responsibilities for space-related activities within DoD. The results of these activities assessing DoD responsibilities will need to be included in a multi-agency review.

REVIEW AND RATIONALIZE U.S. SPACE FUNCTIONS AND RESPONSIBILITIES
(CONT'D)

STEPS TO MAKE IT HAPPEN:

- Seek Secretary of Defense, Secretary of Energy, and the NASA Administrator sponsorship of a review to rationalize/realign agency space functions and responsibilities.

- Incorporate the Administration response to Congress' direction to reorganize DoD space responsibilities into this broader, cross-agency analysis

- Direct the formulation of a Terms of Reference to scope and define the study task

- Direct agencies to identify candidate members of the study team

TASK GROUP RECOMMENDATION:

- The Agency heads may want to jointly review overlapping functions and responsibilities to determine if and where greater efficiencies/cost reduction could result without impacting negatively on the agency missions.

DATE: 4/4/94 **REV: 5** **CATEGORY: 2**

ESTABLISH UNIFORM PRICING POLICY
(DoD, NASA, DOE, DOC, DOT)

Pricing policy for use of government space facilities differs across agencies and is implemented in an irregular manner. Policy should be consistent across agencies. Current law requires no more than reimbursement of additive costs for commercial use of space launch facilities, which recognizes the national importance of space activities and the immature state of US commercial space launch industry. Such an approach should be considered for other space operations activities, including provisions for the organization providing the service to retain the collected fees.

A uniform pricing policy would capitalize on government investment in space infrastructure, facilitate competitiveness of U.S. industry by simplifying use of government facilities and reducing industry costs, provide industry a degree of stability in using government facilities, directly reward most useful facilities; maintain/improve skills of personnel, provide additional motivation for mutual support arrangements, and reflect that the government is responsible for the space infrastructure.

Some of the cons related to a uniform pricing policy include: industry may view as unfair competition; may discourage commercial facilities; some resource burden may be shifted to Agency budgets; and inconsistent with moves toward industrial funding and full cost recovery

The following steps must be implemented before a uniform pricing policy is instituted:

- Quantify current pricing practices and estimate costs to make policy change
- Identify legal, policy, and procedural changes necessary to implement consistent pricing policy across agencies
- Identify legal, policy, and procedural changes necessary for agencies to retain collected funds
- Make specific pricing policy recommendations for space operations facility use, including whether there should be a different policy for commercial and other US Government users

Agency Heads should direct the Aeronautics and Astronautics Coordinating Board (AACB) to develop uniform pricing policy and guidelines for use of government space operations facilities by other governmental agencies and U.S. industry. Actions to include DOE, DOC, and DOT in this process will need to be taken.

ESTABLISH UNIFORM PRICING POLICY
(DoD, NASA, DOE, DOC, DOT)

DESCRIPTION: Pricing policy for use of government space facilities differs across agencies and is implemented in an irregular manner. Policy should be consistent across agencies. Current law requires no more than reimbursement of additive costs for commercial use of space launch facilities, which recognizes the national importance of space activities and the immature state of US commercial space launch industry. Such an approach should be considered for other space operations activities, including provisions for the organization providing the service to retain the collected fees.

PAYOFF POTENTIAL: Capitalize on government investment in space infrastructure

COST SUMMARY: TBD

PROs:
- Facilitate competitiveness of U.S. industry by simplifying use of government facilities and reducing industry costs
- Provide industry a degree of stability in using government facilities
- Directly reward most useful facilities; maintain/improve skills of personnel
- Provide additional motivation for mutual support arrangements
- Reflect that the government is responsible for the space infrastructure

CONs:
- Industry may view as unfair competition; may discourage commercial facilities
- Some resource burden may be shifted to Agency budgets
- Inconsistent with moves toward industrial funding and full cost recovery

STEPS TO MAKE IT HAPPEN:
- Quantify current pricing practices and estimate costs to make policy change
- Identify legal, policy, and procedural changes necessary to implement consistent pricing policy across agencies
- Identify legal, policy, and procedural changes necessary for agencies to retain collected funds
- Make specific pricing policy recommendations for space operations facility use

TASK GROUP RECOMMENDATION:
Agency Heads direct the Aeronautics and Astronautics Coordinating Board (AACB) to develop uniform pricing policy and guidelines for use of government space operations facilities by other governmental agencies and U.S. industry

DATE: 1/12/94 **REV: 4** **CATEGORY: 2**

NATIONAL FACILITIES STUDY

VOLUME 4

SPACE OPERATIONS FACILITIES TASK GROUP

APPENDICES

Appendix A

TERMS OF REFERENCE

NATIONAL FACILITY PLAN DEVELOPMENT

I. BACKGROUND

The United States is increasingly challenged by advances in technologies that will affect its global competitiveness in virtually all economic sectors. Preeminent among these are advances in aerospace technology. These advances are paced by modern highly productive research, development, and operational facilities. Recognizing this situation, on November 13, 1992, the NASA Administrator initiated the development of a comprehensive and integrated long-term plan for future aerospace facilities. This integrated plan would be accomplished in partnership with other Government agencies, industry, and academia to ensure that the facilities are world-class and to avoid duplication of effort. He contacted top officials in the Departments of Defense, Energy, Transportation, Commerce, and the National Science Foundation inviting them to participate in the development of the plan and the appropriate working groups. The Administrator proposed an Oversight Group chaired by John R. Dailey, NASA Associate Deputy Administrator, with representation from DoD, DoT, DoE, DoC, and the NSF. Each of the agencies responded with nominations of individuals to serve on the Oversight Group and provide support on Task Groups to establish detailed plans. This Terms of Reference document provides the coordinated charter for development of the Aerospace Facilities Plan.

II. PURPOSE

To formulate a coordinated National Plan for world-class aeronautical and space facilities that meets the current and projected needs for commercial and Government research and development, and for Government and commercial space operations.

III. SCOPE

The plan will include a catalogue of existing Government and industry facilities that support aeronautics and astronautics research, development, testing, and operations. International facilities will also be catalogued to determine capability relative to U.S. facilities and applicability to address U.S. facility shortfalls.

The plan will include a requirements analysis which will consider current and future Government and commercial industry needs as well as DoD and NASA mission requirements, through the year 2023, and specifically will address shortfalls in existing capabilities, new facility requirements, upgrades, consolidation, and phase out of existing facilities. All new facility requirements and upgrades will be prioritized and detailed schedules and total funding will be specified. Joint management schemes, life cycle costs, and siting requirements will be fully evaluated.

Joint funding between agencies and Government/industry will be considered. Shared usage policies will be developed where nonexistent.

Costing, definitions, evaluation methodology and dollar threshold for facility inclusion in review will be approved by the Oversight Group.

IV. ORGANIZATION

An Oversight Group, chaired by NASA with a DoD Vice-Chairman and including membership from DoE, DoT, DoC and the National Science Foundation, will have responsibility for implementing this TOR and plan development. The secretary will be nominated by NASA.

The chairman will appoint a study director for executing this TOR. This person will be responsible for conducting the study and its schedule, coordinating participation, integrating all inputs, preparing the final products, and providing those products to the Oversight Group.

To assist the study director, four task groups will be established. These are the Aeronautics R&D Task Group, the Space R&D Task Group, the Space Operations Task Group and the Facilities Costing and Engineering Group. The task groups will be cochaired by NASA and DoD. All participating agencies will provide representatives to each task group. The task groups will have the authority to establish working groups to assist them in their tasks. Membership on the task and working groups will be limited to Government employees and participation is optional, except for NASA and DoD. The Aeronautics Task Group is an exception because of the special need to address commercial transport aircraft. For this reason experts from private industry participate as Special Government Employees, and the task group will function in accordance with the Federal Advisory Committee Act. Throughout the study, however, industry and academic inputs and advice should be actively solicited.

The Oversight Group will provide guidance to the task groups, serve as the coordination mechanism, perform periodic progress reviews, resolve disputes or misunderstandings that may arise between the agencies under the memorandum, and recommend an integrated plan for agency approval. The task groups will have responsibility for planning, directing, and providing recommendations in their particular discipline area.

Each agency will utilize its own reporting and tasking authority and will bear its and its employees' own costs for participation. Activities shall be subject to the availability of funds and personnel of each party.

V. PRODUCT

The study director will provide a summary report to the Oversight Group incorporating input from each of the task groups that includes a compendium of current facilities and capabilities; identification of shortfalls as a function of current and projected needs; and recommendations and rationale for new facilities, upgrades, consolidation, or closure of existing facilities. Recommendations will include cost impacts, either as investment costs or savings, and any other considerations that would bear on the decision (i.e., national security concerns, technology transfer, proprietary data rights, commercial competitiveness, etc.). The summary report will also include any recommendations relative to a policy nature, such as shared usage, common costing, and management and operation.

Upon approval by the Oversight Group, each report will be forwarded for agency approval. Final reports will be approved at the Deputy Administrator/Under Secretary level or equivalent. For the DoD, the responsible authority is the Under Secretary of Defense for Acquisition. Final reports should reflect a national viewpoint endorsed by NASA, DoD, DoC, DoT, DoE and NSF.

VI. SCHEDULE

Interim Task Group Reports (to support FY '95 budget decisions)	July 1993
Final Task Group Reports	January 1994
Oversight Approval - Task Group Reports	February 1994
Coordination of Individual Reports	March 1994
Approval of Individual Reports	March 1994

VII. APPROVAL, AMENDMENT, AND TERMINATION

This Terms of Reference shall enter into force upon the signature of all Parties and shall remain in force through July 1994. It may be modified, extended, or terminated by mutual consent of all parties.

Original Approved by:

Department of Commerce, David Barram, Deputy Secretary
Department of Defense, William J. Perry, Deputy Secretary
Department of Energy, Bill White, Deputy Secretary
Department of Transportation, Mortimer L. Downey, Deputy Secretary
National Aeronautics and Space Administration, Daniel S. Goldin, Administrator

TERMS OF REFERENCE (TOR) FOR

SPACE OPERATIONS FACILITIES TASK GROUP

1. BACKGROUND

The Administrator of the National Aeronautics and Space Administrations (NASA) and the Deputy Secretary of Defense agreed to enter into a joint study to develop a comprehensive and integrated long-term plan for future world-class aerospace facilities. The plan will address current capabilities and projected government and industry aeronautics and space facility needs through 2023 and, when appropriate, make recommendations relative to development of new facilities and/or enhancement or consolidation of existing facilities.

This NASA-DOD Joint Facility Study is divided into three Task Groups, addressing Aeronautics Research and Development (R&D) Facilities, Space R&D Facilities, and Space Operations Facilities. This TOR addresses the Space Operations Facilities Task Group and is derived from the Terms of Reference for the National Plan.

There are inherent differences in aeronautical facilities and space facilities. National security space activities and associated facilities have predominately been driven by and dedicated to supporting specific space systems. While the possibility for consolidation and shared facility usage is less probable in these space activities than in aeronautics facilities, given shrinking budgets, we need to exploit opportunities for consolidation and sharing of facilities when appropriate. A detailed assessment and long term plan for future space operations facilities can provide a roadmap to assist us in identifying the opportunities for gaining efficiencies through multi-use and shared facilities in the future as we continue to build our nation's space operations infrastructure.

2. PURPOSE

To determine the capability of national and international space operations facilities to meet future space operations mission requirements and, as appropriate, develop a long term national plan for facility acquisition and shared usage.

3. SCOPE

Space operations facilities involve all facilities necessary to safely transport desired payloads to prescribed orbits, to carry out suborbital rocket launches (excluding launches of operational weapon systems) and to operate spacecraft on-orbit. Space operations facilities also includes those significant manufacturing facilities that provide the pipeline of launch vehicle and upper stage hardware in support of space operations. The Space Operations Task Group will consider facilities required to support the following specific functions and activities:

a. All launch vehicle and payload assembly, mating, checkout and preparations conducted at the launch base.

b. Repair, maintenance, and refurbishment of launch vehicles, payloads, and associated support equipment.

c. Launch preparations, countdown, and execution of space launch vehicle and suborbital rocket launches.

d. Repair, maintenance, refurbishment of launch and operations pads, instrumentation, fueling, storage and other support facilities and equipment used to safely conduct and sustain launch and on-orbit operations.

e. Checkout, operations and sustainment of on-orbit spacecraft.

f. Repair, maintenance, refurbishment of all facilities and equipment used in support of checkout, operations and sustainment of on-orbit assets.

g. Real time receipt, processing and display of data.

h. Interface for dissemination of mission data to end users.

i. Recovery of vehicle/payload components.

j. Those training and simulation capabilities needed to support checkout, launch, on-orbit operations and Research and Development Testing and Evaluation (RDT&E).

k. Operations, sustainment, and repair of all command, control, and communications necessary to execute the functions listed above.

Commercial space operations including existing and planned facilities will be addressed when analyzing future space launch requirements.

Finally, NASA and the DOD have differing missions, resulting in different space operations facilities requirements. For the purpose of this study, some mission-unique national security space operations facilities dedicated to supporting specific national security programs offer little opportunity for shared usage and thus may be beyond the scope of this study. Rationale for excluding specific facilities will be documented appropriately.

4. ORGANIZATION

The Space Operations Facilities Task Group will be co-chaired by Mr Gerald Smith, Deputy Director for the Stennis Space Center and Mr Richard McCormick, Deputy Assistant Secretary of the Air Force for Space Plans and Policy. The following subgroups will support the Task Group and will be co-chaired by NASA and DOD:

Requirements and Integration
Cost Analysis
Payload Processing, Launch and Recovery Facilities
Manufacturing Facilities
Mission Operations Facilities

Requirements and Integration

This group serves both to document mission needs as well as to integrate results from the other subgroups. They will compile and provide top level mission requirements for DOD, civil, and commercial space launches and they will review and integrate the resultant facilities-level requirements into an overall space operations requirements document. They will maintain an awareness of other subgroup activities to include participation in selected meetings and site visits with other subgroups, will identify areas of overlap between the subgroups as well as assess opportunities for joint use of facilities across the subgroups, and periodically check on progress of subgroup products. They will be the primary interface with the Space R&D Facilities Task Group with regard to underlying mission requirements, overlap between subgroups and

opportunities for joint use of facilities between the space R&D and space operations communities. Finally, this working group will prepare an integrated roadmap of actions needed to implement Task Group recommendations and ensure compatibility with the R&D Task Group recommendations as appropriate. They will be responsible for integrating the subgroup inputs into a final report and will work with the R&D Facilities Task Group to develop a common format for the final report.

Cost Analysis

This group will define cost criteria as needed to support the other technical working groups, When appropriate, the group will assist in obtaining relevant cost information. In addition, this group will also provide cost analysis expertise to the other working groups via matrix management of cost analysts to these groups. Finally this group will support the evaluation and analysis of shortfalls and excess capacity.

Payload Processing, Launch and Recovery Facilities

This group will address payload processing, launch and recovery facilities needed to support orbital, suborbital and ballistic missions (to exclude operational weapon systems). All "launch critical" items will be included while all indirect support and infrastructure facilities will be excluded during the first iteration. Launch facilities will include control, structure, landing strips and recovery facilities. Payload, booster and ordnance processing facilities will be included as will range instrumentation, range control and the range network. Some other support facilities (e.g. safety, administraiton, supply, security, transportation, environmental, maintenance communications, weather, power, precision measuring equipment laboratory and fuels) facilities may be addressed.

Manufacturing Facilities

This subgroup will formulate a coordinated national plan for world class launch vehicle and upper stage manufacturing facilities in support of space operations that satisfy the current and projected needs for both commercial and government requirements. They will define where consolidation and or closure of existing facilities is appropriate; determine where US manufacturing facilities do not meet national space operations needs and define new and/or modified facilities required to achieve world class status. Finally they will develop a long term plan for world class

facility acquisition and shared usage. The group's focus will be limited initially to those facility relating to tanks and assembly, liquid engines and solid rocket motors, although other categories may be added in the course of the study.

Mission Operations and Training

The Mission Operations and Training subgroup will conduct an assessment of national and international space operations and training capabilities required to meet future mission operations and training requirements and to recommend actions consistent with the development of a long term national plan for world-class facility acquisition and shared usage, including the communications capability required to support these functions. This subgroup will evaluate all on-orbit, deep space and interplanetary mission control centers of all types to include communications and tracking network, spacecraft control centers; payload operations and control centers; on-orbit flight support rooms; and other installations of command and control systems supporting on-orbit flights. Also included in this evaluation will be training facilities that support the education of flight crews, flight controllers, and ground personnel involved in or-orbit support. This will include neutral buoyancy facilities, simulators, part-task trainers, and engineering test beds that support training. In addition, the group will evaluate critical ancillary capabilities that are in direct support of the above (e.g. backup power, communications systems, training aircraft, and other systems that are in stand-by to support flight anomaly resolution). Included in this evaluation are all spacecraft command and control software development and certification installations. Vacuum chambers involved in training are excluded from this subgroup.5. APPROACH

The Space Operations Facility Assessment will include the following 6 tasks. Tasks 1-2 will be done in parallel; results will drive Tasks 3-6.

Task 1: Develop definitions for "space operations" and "space operations facilities". Given the definitions, develop inventory criteria for space operations facilities. The criteria will allow identification of DOD and NASA payload processing, launch, recovery, manufacturing, mission operations, and communications facilities that are within the scope of the study as defined above.

Task 2: Identify current and projected mission needs that drive facility requirements. The mission needs will also

provide the basis for developing a national plan should it be required.

Task 3: For the purposes of this study, a world class facility is defined as any facility that provides a capability, capacity, product, technology and/or manufacturing process recognized by the world aerospace community as among the best. In addition, by being world-class, the facility allows the United States to most effectively perform space operations functions and/or maintain a competitive advantage. Indicators include, but are not limited to, advanced state-of-the-art technology,unique testing capability, unique capacity, unique location (easy access) or the most efficient, highest quality facility. The world class model for space operations is that which produces assured access to space, as defined by the users (satellite community), across the entire spectrum of launch and satellite preparation, launch vehicle and satellite integration and testing, and range support systems available. The subgroups will assess facilities as a function of the functionality and specific critical parameters necessary to meet the definition of world class provided above.

Task 4: Inventory space operations facilities in accordance with the criteria defined in Task 1. Catalog facilities as functions of mission need(s) defined in Task 2.

Task 5: Assess mission requirements, facilities shortfalls, and excess capacity; recommend actions to include the need for the development of a long-term national plan.

Task 6: Based on Task 1 through 5, develop options, recommendations, and an action plan as required for Oversight Group review and approval.

6. PRODUCT

The Space Operations Task Group will submit a summary report to the Oversight Group that includes a description of current and future mission needs, a description of world class capability for each technical area, a compendium of current facilities and capabilities, an identification of shortfalls or excess capacity, and if required, an implementation plan that includes recommendations and rationale for new facilities, upgrades to existing facilities, or facility consolidations.

7. SCHEDULE (TBR)

Charter Approval	May 93
Mission Needs Assessment	Jun 93
Initial Facility Inventory Complete	Aug 93
Capabilities Assessment	Oct 93
Preliminary Plan	Dec 93
Brief Oversight Group	Aug 93
Final Plan (Task Group Approval)	Dec 93
Final Report (Oversight Group)	Feb 94

APPROVED

Robert McCorkle

DOD Co-chair

Gerald W. Smith

NASA Co-chair

SPACE OPERATIONS Facility Task Group

Richard McCormick, Co-Chair, *SAF/SX*
Gerald Smith, Co-Chair, *NASA - SSC*

Nancy Bray, (Exec. Asst.), *NASA - KSC*
David W. Harris, *NASA - Hqts*
Lt. Col. Stan Mushaw, (Exec. Asst.), *SAF/SX*
Lt. Col. Laura Kennedy, (Exec. Asst.), *SAF /SX*
Samuel Malone, *NASA - Hqts*
Dick Scott, *DOT*
Ralph Spillinger, *NASA - Hqts*
Larry Heacock - *NOAA*

WORKING GROUPS

MANUFACTURING

William Briggs, Co-Chair, *SMC*
Jim Kennedy, Co-Chair, *NASA - MSFC*

Henry Harris, (Exec Asst.), *NASA, KSC*
Len Sirota, *NASA - Hqts*
Janos Borsody, *NASA - LeRC*
John Howell, *NASA - MSFC*
Ron Burns, *NASA - MSFC*
Gary Coultas, *NASA - JSC*
Lon Miller, *NASA - Stennis*
Gary Hawkins, *Aerospace Corp.*

COST ANALYSIS

Judy Simonds, Co-Chair, *NASA-Hqts*
Col. Steve Willoughby, Co-Chair, *AF/XOFS*

MSgt. Ed Fuller, *AF/XOFS*
John Howell, *NASA-MSFC*
Todd Sampsel, *NASA-JSC*
Gary Gaukler, *NASA-Hqts*
Walt Feitshans, *NASA-KSC*
Chris Winiewicz, *NASA-KSC*

PAYLOAD PROCESSING, LAUNCH AND RECOVERY

Col. Robert Recker, Co-Chair,
Bill Tolson, Co-Chair, *NASA- KSC*

Don Page, *NASA-KSC*
Dick Thornburg *NASA-KSC*
Frank McInerny, *NASA- KSC*
Dick Hahn, *NASA-KSC*
Bob Nelson, *NASA-KSC*
Larry Schultz, *NASA-KSC*
Walt Feitshans, *NASA-KSC*
Marci Hutson, *VAFB*
Ralph Holweck, USArmy
J.B. Roberts, NASA-KSC
Bill Holden, NASA-KSC
Chris Winiewicz, NASA-KSC
Hal Theiss, *NASA-HQ*
Maj. Gene Rondash, *VAFB*
Deborah Ellis, *VAFB*
Terry Jaggers, *DoD*
Dave Stone, *DoD*
SSg. Greg Paci
Joe Duke, *NASA-WFF*
Mike Conger, *NASA-WFF*
Ed Christie, *White Sands*
Weston Wolff, *White Sands*
Michele Athman, *Inet-KSC*

REQUIREMENTS & INTEGRATION

Darrell Branscome, Co-Chair, *NASA-LaRC*
Lt. Col. Rick Reynolds, Co-Chair, *AFSPC*

Bob Brodowski, NASA -Hqts
Capt. Dave Hollenbach, AFSPC

MISSION OPERATIONS & TRAINING

Grady McCright, Co-Chair, *NASA-JSC*
Lt. Col. Tom Riebe, Co-Chair, *AFSPC*

James Allen, *JPL*
Rocky Clark, *NASA- MSFC*
C.W. Vowell, *NASA - JSC*
Joe Maloy, *NASA - JSC*
W. Langdoc, *NASA - JSC*
Dick Scott, *DOT*
Carroll Dudley, *NASA - GSFC*
Chuck Henschel, *NASA - KSC*
Todd Sampsel, *NASA - JSC*
Pat Gamble, *USNavy, NAVSOC*
Maj. Dave Folts, *US Air Force*
Gail Workman, *US Navy, NAVSPACECOM*
Hume McClure, *NOAA*
Maj. Hugh Youmans, *AFSPC*
Maj. Ray Hill, *USArmy*

STRATEGIES

Col. G.R. Middleton, Co-Chair, *SAF/SX*
R. Williams, Co-Chair, *NASA - Hqts.*

W. Hufstetler, *NASA - JSC*

1/28/94

MI93144